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URNS A WASHERMAN.

A REPORT has appeared in the Daily press that an M.A. of the Punjab University has started working as a washerman. He did not get a job for two years; certainly he has done better than to go in for killing himself as some other educated unemployed had hitherto done.

There are educated washermen in Calcutta and other places, a very large number of them opening themselves as washing traders and giving employment to many caste washermen. They availed themselves of their qualification to organise the trade on modern business basis.

Some time ago we heard of a graduate working as a shoe-black. Shoe-repairing and shoe-blackening has big prospect ahead provided an intelligent brain takes up to organise the trade. It is surely insane waste of intellect and education if an educated fellow takes up a trade of lower order and cannot find way to organise it on better business basis.

In Calcutta only recently an educated gentleman hit upon an idea to give a trade name to a common commodity of food and distribute it in a special pack. He is now selling it by cartload through agents collected from street boys.

There is money in new idea. Having claim to education if you go in to compete with age-old worker or trader without instilling any new idea in the business your education has no meaning. If any educated man take a common avocation for his livelihood he must find out a new method of presentation, a new name for the ware, a new mode of service to the people. For, as we already know, a business must always aim at rendering a service for which the public is willing to pay a profit making price.

The M.A. must not turn into a washerman only but into an educated washerman who can think of his trade from a new vision of service. Let him be an example to his fellow graduates.

MOULDING OF METALS.

MOULDING is an ancient industry in India. Mouldings of metal and alloys of copper, brass, bell-metal, iron, and others producing a great variety of articles of different shapes and sizes have been in use from time immemorial. There is hardly a home where metal utensils are not to be found. In spite of the advent of cheap enamelled and porcelain wares, the demand for these metal wares still continues. It is the purpose of this article to deal with the art of moulding from the practical point of view so that any one with scanty knowledge of the art can do this industry profitably.

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THE MAKING OF MOULDS.

The general principle in making mould is that the pattern of the article to be cast is embedded in the sand producing its shape in the moulding material, and then, the pattern having been removed the cavity is filled with molten metal. The mould is generally made in a box or flask which may be built up in sections made it fit over each other and to fasten securely together for the purpose of confining and strengthening the sand mould. Moulding boxes may be made either of wood or iron, but in ordinary practice metal boxes are commonly used, as they are capable of standing more severe treatment and do not warp as wooden boxes do. They are made of all sizes and of a variety of shapes, in section round, square, or rectangular, or a combination of all three. Most patterns may be moulded in the boxes, an upper and a lower box, often termed the cope and the

drag, but in many instances it is necessary to have other boxes fitted intermediately between the cope and the drag to accommodate the pattern satisfactorily, and such an arrangement is known as a nest of boxes, the intermediate boxes being technically termed "mid pats."

These two half-moulds, having been turned over to allow the extraction of the pattern, are now fitted together and the tightly cramped or otherwise fastened. In the construction of the mould channels or passages have been made whereby the molten metal may enter and the air may leave the mould.

Mould made in the ordinary damp sand without any drying previous to the metal being poured into them are to be made in green sand, while castings in moulds, which first prepared in green sand, have been thoroughly dried before the metal is poured, are termed "dry sand castings." There are also large castings, generally of circular or similar section to be made, for which the cost of making complete patterns would be prohibitive, and the moulds for these are usually built up with brick and covered with sand mixed with water into a stiff paste, so that it can be moulded by variously shaped boards or strickles rotating on an axis, or moving along guides into the shape required. This method goes by the name of "loam moulding." In making hollow castings it is necessary that in the mould the cavity should be filled with material which will confine the metal into those channels which will give the required

shape of the article on solidifying the metal. The "inside moulds" are termed cores and core making as a matter of fact is a special branch of the moulder's art and is, therefore, taken up separately.

Now let us go through the processes of making moulds step by step. The best kind of mould for casting iron and brass is usually made of green sand. A couple of iron frames form a case or box, which serves as an envelope to the mould. Such boxes constitute an essential and very expensive part of the furniture of a moulder. It is a rectangular frame, without bottom or lid, whose two largest sides are united by a series of cross bars, parallel to each other, and placed from 5 to 8 inches apart. The two halves of the box carry ears corresponding exactly with one another; of which one set is pierced with holes, but the other has points which enter truly into these holes, and may be made fast in them by cross pins or wedges, so that the pair becomes one solid body. Within this frame there is abundance of room for containing the pattern of the piece to be moulded with its encasing sand, which being rammed into the frame, is retained by friction against the lateral faces and cross bars of the mould.

When a mould is to be formed, a box of suitable dimensions is taken as under, and each half No. 1 & 2 is laid upon the floor. Green sand is thrown with a shovel into No. 1 so as to fill it; when it is gently pressed in with a rammer. The object of this operation is to form a plane surface upon which to lay in the pattern with a slight degree of pressure, varying with its shape. No. 1 being covered with sand, the frame No. 2 is laid upon it, so

as to form the box. No. 2 being now filled carefully with sand, the box is inverted, so as to place No. 1 uppermost, which is then detached and lifted off in a truly vertical position carrying with it the body of sand formed at the commencement of the operation. The pattern remains imbedded in the sand of No. 2, which has been exactly moulded upon a great portion of its surface. The moulder condenses the sand in the parts nearest to the pattern, by sprinkling a little water upon it, and trimming the illshaped parts with small iron trowels of different kinds. He then dusts a little well-dried finely sifted sand over all the visible surface of the pattern, and of the sand surrounding it; this is done to prevent adhesion when he replaces the frame No. 1.

The moulder next destroys the preparatory smooth bed or area formed in this frame, covers the pattern with green sand, replaces the frame 1 upon 2 to reproduce the box, and proceeds to fill the frame No. 1, as he had previously done No. 2. The object of this operation is to obtain very exactly a concavity in the frame No. 1, having the shape of the part of the model impressed coarsely upon the surface formed at the beginning, and which was meant merely to support the pattern and the sand sprinkled over it, till it got imbedded in No. 2.

BAKED SAND MOULDS.

When the castings are large, hydrostatic pressure of the melted metal upon the sides of the mould cannot be counteracted by the force of cohesion which the sand acquires by ramming. We must in that case attach to each of these frames a solid side, pierced with numerous small holes to give issue to the gases

This does not form one body with the rest of the frame, but is attached to it by bars and wedged bolts. The mechanical part of this process is the same as that of the preceding with the exception that no ground coal is mixed with the sand. Whenever the mould is finished, it is transferred to the drying stove, where it may remain from 12 to 24 hours to be deprived of all its humidity. The sand is then said to be baked. These moulds allow the gases to pass through them much more readily than those made of green sand.

LOAM MOULDS.

This moulding in loam is executed from drawings of the pieces to be moulded, without actually making patterns. The mould is formed of a pasty mixture of clay, water, sand, cow's hair, or other cheap filamentous matter, kneaded together in what is called the loam mill. The proportions of the ingredients are varied to suit the nature of the casting. When the paste requires to be made very light, horse-dung or chopped straw is added to it. As the process of making this type of mould is very complicated its description for the present has been dispensed with.

METAL MOULDS.

Where castings of similar articles in large numbers are required, metal moulds are extensively used especially for the production of various types of castings in white anti-friction alloys in brasses and in bronzes. Moulds of this description are known as chills, or dies, or permanent moulds, and while they have not been used to the same extent in the casting of iron, owing to lower melting point, as in

the casting of nonferrous articles, they have been used with satisfactory results.

FILLING THE MOULDS.

There are two principles on which the metal may be poured into moulds,—the descending and the ascending. In the former case the molten metal enters the mould at its highest point and runs between the core and the face of the mould to the bottom; then gradually filling up all the space provided for it, it finally reaches the top again. On the other hand when metal is poured on the ascending principle the metal is taken down to the lowest part of the mould before it enters the cavity, the metal thus filling the mould from the bottom and gradually rising to the top. This ascending method is likely to be the better of the two because the metal when enters the mould the air inside becomes very greatly heated and expanded. It must all get out somehow, and vents are provided to carry it off. But on its way to the vents, if the casting is arranged on the descending principle, it must meet the stream of molten metal, which comes trickling over the core and face of the mould. Some of the air will be caught by the molten metal and carried along with it. Expanding very violently, it will bubble out through the molten metal, causing a great disturbance and perhaps injuring the surface of the mould. If, however, the metal enters the mould from the bottom all the air and the vents are above it. The air can then get out as fast as it likes without any danger of trapping or other interference. Also any scum or dross will float on the surface of the metal and be carried to the vents instead of being caught by the descending metal and

carried perhaps to the face of the mould. For these reasons it is well to pour always on the ascending principle.

THE METALS.

The metal for moulding purpose must be our next consideration as different metal requires different treatment in melting it. Platinum cannot be melted with the ordinary gas blow pipe or in the furnace; a supply of pure oxygen, as in the oxyhydrogen blowpipe, being necessary to fuse it. Gold and its alloys cast well, as do fine and standard silver. The metal or alloy is generally put in a fireclay crucible with a little powdered borax on top. Pieces of charcoal should be put in also but powdered charcoal is likely to get into the cat and injure it. More metal can be added when that put in first settles down in the crucible. Add a tiny piece of zinc to the gold or silver before pouring. Copper does not cast well, so it is generally alloyed. The addition of a little zinc, tin and lead to the copper, produces an excellent alloy. When copper is alloyed with a small proportion of tin the result is known as bronze: if alloyed with zinc it is known as brass. The ingredients of a few well-known alloys are given below:—

ALUMINIUM BRONZE.

Copper	9 parts.
Aluminium	1 part.

BELL-METAL.

Copper	3 to 5 parts.
Tin	1 part.

BRASS.

Copper	7 parts.
Zinc.	3 "

BRONZE.

Copper	90 parts.
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Tin	6 parts.
Lead	1 part.

GERMAN SILVER.

Copper	23 parts.
Nickel	17 "
Zinc	10 "

GUN METAL.

Copper	9 parts.
Tin	1 part.
Zinc	Trace.

GOLD (18 CT.)

Gold	36 parts.
Silver	7 "
Copper	5 "

GOLD (22 CT.)

Gold	22 parts.
Copper	2 "

FUSIBLE METAL.

Lead	13 parts.
Zinc	3 "
Bismuth	6 "

(suitable for small casts.)

Bronze composed of copper with a small percentage of tin does not flow so well as a similar alloy to which a little zinc or lead has been added; so the bronze used by founders frequently has 3 or 6 per cent. of both tin and zinc and perhaps 1 per cent. of lead.

In making the alloys indicated the copper should be melted in a crucible under a layer of charcoal. Pearlash, cream of tartar or even common salt is used as a flux. They are all better than borax. The tin, or tin and zinc should be warmed to near their melting point and then added to the copper. The mixture should be thoroughly stirred,

PROCESS OF POURING THE MOLTEN METALS AND ALLOYS.

When the metal or alloy has been completely melted it should be stirred

well before the crucible is removed from the furnace. Some founders do this with a piece of charcoal gripped in the tongs, others stir with a green stick. The crucible tongs have curved jaws which securely grip the crucible so that it may be lifted safely. The molten metal is now skimmed to remove any dross or floating charcoal and tipping into the basin-shaped hollow at the head of the pour. If there is no such hollow provided, it is well to keep back with a strip of iron any dross, flux or charcoal which may yet float on the metal. The metal should be poured in very steadily, that is to say, in a continuous stream without any stoppages. The metal should run in quietly, without bubbling and gradually rise in the vents. Continue to pour steadily until the metal ceases to run down. Leave a good mass of metal in the pour. Its weight will force the metal below it into all the hollows of the mould, if the vents are working properly. If all has gone quietly the head of the metal will go a little hollow in the centre as the metal cools. If however, the metal bubbles and splutters when you pour, either the gates and vents have not been properly constructed or the mould is damp. In either case the cast will probably be damaged.

BREAKING THE MOULDS.

The mould should be broken down as soon as possible after the metal has set. But it must be done carefully, for the heated metal is easily injured. With a hack saw cut off all the gates and vents, for they are now represented by rods and threads of metal attached to the cast. Saw then off as close to the work as possible. If the core is to be removed, rake

it out through any available opening. In casting large bells it is usual to rake out the core before the metal has had time to cool down, for the shrinkage of the bell on the core might otherwise cause cracks in the work.

The irons which supported the core should be cut out. The whole work is now scrubbed clean; and afterwards, if small, boiled out in pickle. Casts made in the fusible alloys above mentioned cannot, however, be pickled in hot solutions. The holes made by the irons are now to be plugged up. They should be tapped, and pieces of metal screwed into them. All rough parts are now gone over with files and raffles, and finally with chasing tools. After tapping the legs for the screws which are to hold the cast into its base if required the work is ready for colouring.

HOT STAMPING OR PRESSING OF METALS.

Hot stamping or pressing must not be confronted with moulding as described above because the two processes differ in several important particulars, the main distinction being, that while mouldings are usually produced from white metals of low melting point forced into moulds in a liquid state, hot stampings are made from hard metals, such as brass, bronze, etc., heated to a plastic state and pressed in hardened steel dies.

A considerable amount of technical skill obtained by long training, is required, not only for producing the dies, but also for turning out the work efficiently, expeditiously and exactly, and for selecting the shapes and sizes of the billets; shrinkage in cooling has to be reckoned

with, and the best method of clearance from the dies has to be ascertained.

The advantages of hot-stamping are numerous; amongst them may be mentioned:

The work turned out by his method is reliable, exact and has the solidity of grain not to be found in castings. It is not liable to troublesome blow-holes, so frequently met with in castings, besides being toughened, by the very process of pressing it in a plastic state. As all workers in brass know a freedom from blow-holes is a great advantage; brass machinists have learnt to their cost how often they come up against such flaws and holes, when tools and drills are broken; all this waste of time and energy is avoided by using the hot stamping process. The presses used for this process may be either of the screw or spindle type. Obviously the frame and other parts of such machines must be very strong in order to withstand the enormous strain.

In eccentric presses of this kind the driving pulley is combined with the flywheel, which runs free on the horizontal spindle, and can be geared to the latter by a powerful coupling actuated by a footlever. A safety device is provided in the form of a breakable element, which collapses in the event of the pressure approaching the limits of safety.

The coupling between the connecting rod and the press block is formed by a ball-joint bolt by means of which the press-block can be adjusted in a vertical direction, which enables the operator to use dies of different depths and to adjust, within certain limits, the position of the press block.

The action of these presses must be so quick that it is impossible to use such a press continuously and for every stroke provision is made to throw the clutch automatically out of gear, even if the workman should accidentally have kept his foot on the starting pedal. A powerful brake will thus automatically bring the press to rest when the press-block is in the highest position; for every succeeding press motion the starting pedal must be pressed down again.

Screw presses destined for these purposes must also be very substantially built; there is no doubt that such screw presses can exercise a pressure which cannot be equalled by eccentric presses, though in cases where it is necessary to produce a perfectly uniform pressure upon the whole area of the hot brass object, the eccentric press may in some cases be superior. Against this is to be said that the eccentric press is more exposed to "peak" strains if an object is pressed which has not been sufficiently heated.

The improved type of power driven screw percussion stamping press, is now extensively used for making hot stamped parts, from brass and yellow metal, such as fuse bodies, base plugs, nose brushes, heavy and light magneto beds, end covers, hub caps, levers and similar articles. The pressures on this class of press vary from 70 to 400 tons, but generally speaking 200 tons available pressure will produce a good many of the above-named articles.

It may be of interest to outline briefly the construction of these presses, which are extremely simple in design and use.

The pressure is taken by the main frame in direct tension and the drive is effected by belt through fast and loose pulleys, friction discs and heavy friction wheel. The control is by hand lever from the front of the machine, by depression of which the discs are brought into contact with the friction wheel, and consequently the movements of the slide are absolutely under the control of the operator. After the blow is delivered, the slide automatically returns to the top of its stroke and remains there until the lever is depressed again.

The slide is necessarily of solid cast steel accurately guided by long guides working on adjustable strips; this gives sharp outlines and the work produced is exceedingly uniform.

Presses of this type are more accurate than drop stamps and much more material may be handled with less labour; the figures we have before us state that upwards of 2,500 pieces may be made off each machine per normal working day of 10 hours.

MANUFACTURE OF CITRIC ACID.

CITRIC acid, as its name implies, occurs principally in the juice of the citrus fruits and is chiefly responsible for the taste of these fruits. Commercially it is derived mainly from the juice of the lemon, although smaller amounts are obtained from the lime, bergamot, and orange. Citric acid is usually made from the inferior fruit or "Cull lemons" which has been damaged by insects, fungi or frost, or which are mishappens, under-ripened or even oversized. It may be

regarded therefore, as a by-product of the lemon growing industry.

USES.

The principal use of citric acid is in the manufacture of beverages and effervescent salts. It is also used in the manufacture of many salts which are used in medicine, including the citrates of ammonium, bismuth, caffeine, iron, lithium, magnesium, potassium, quinine, and sodium. Citric acid and sodium citrate find some application in textile printing and in the manufacture of a few dyes. Many formulas for photographic developers and toning baths contain citric acid or sodium citrate. Ferric ammonium citrate is used in the manufacture of blue-print paper. Citric acid and ammonium citrate are important laboratory reagents. They are essential for the determination of phosphates in fertilizers, which ranks as one of the most important of analytical operations.

From 8,000 lemons, pressed in a suitable press 700 litres of juice containing 4.5 to 6 per cent of citric acid are obtained. Fresh lemon juice contains also 7 to 9 per cent of glucose, 0.2 to 0.8 per cent of saccharose (according as the lemons are sour or ripe), certain extractive, gummy, and pectic substances (about 0.2 per cent. for ripe and 0.8 per cent. for unripe fruit), and about 0.5 to 0.7 per cent of inorganic salts. The presence of these substances renders it impossible to crystallise the citric acid merely by concentrating the juice, even when all the glucose is transformed into alcohol (5 to 6 per cent.), so that the citric acid is separated by Scheele's Classical and rather costly process, accord-

ing to which it is first converted into calcium citrate.

CITRIC ACID.

The lemons are first peeled, a workman removing the peel with three cuts of the knife, slicing the lemon in two and throwing it into a tub; the peel is collected separately for preparation of essence. The sliced fruit is bruised, the pulp is placed in bags made of rushes or coir and the juice expressed in a press. The juice is treated thus: into 100 hectolitre masonry vessels provided with stirrers and cold-coater coils are placed 20 hectolitres of concentrated juice and 80 hectolitres of water, the liquid then being well mixed for 30 minutes and allowed to ferment, the glucose thus converted into alcohol and the juice clarified. By passing very cold water through the coil, the temperature of the liquid is lowered to 5° and a large part of the dissolved and suspended extractive and mucilaginous matters separated; in presence of a little tannin, these matters coagulate and do not redissolve (50 litres of so much extract at 10°Be are sufficient, the liquid being stirred for 15 to 20 minutes immediately after the addition). The solution is then passed by the filter presses and thence into 20 hectolitre wooden vats or into brickwork vessels similar to the preceding ones, but provided with perforated coils for direct steam heating. The boiling liquid is now neutralised exactly with dense milk of lime or with powdered calcium carbonate. The latter causes frothing and sometimes overflow of the liquid, but precipitates a purer calcium citrate, while the hydroxide throws down many pectic and colouring matters. In some cases two-thirds of the

VOL. XXV. No. 298.

acidity is neutralised with calcium hydroxide and the remainder by the carbonate. For every 100 kilos of citric acid present (titrated) 45 kilos of quicklime (57 of slaked lime per 80 of the carbonate) are added. After stirring while hot, the insoluble tricalcium citrate—which forms immediately—is passed at once through the filter presses and washed for 10 minutes with very hot water, for 10 minutes with tepid water, and for 5 minutes with cold water, which should remain almost colourless. The cakes of calcium citrate from the filter presses are mixed in 20 hectolitre lead-lined vessels with 15 hectolitre of cold water, the lime of the citrate being then neutralised exactly with dilute sulphuric acid (1 : 5) (with 100 kilos of citric acid in the juice correspond 400 kilos of this dilute acid); a slight excess of sulphuric acid is always added, since the presence of unaltered calcium citrate would hinder the crystallisation of the acid.

The acid is added in portions at the rate of 5 litres per minute, the liquid being kept well mixed and direct steam applied through a perforated leaden coil. The mass is boiled for 10 to 15 minutes the steam being then suspended and the whole mixed for 30 minutes. The calcium sulphate is then removed by means of a filter press and is washed with 200 litres of boiling water, which is added to the first filtrate, and then with cold water, which is afterwards used for treating fresh calcium citrate. The citric acid solutions from the filter presses contain only minimum quantities of sulphuric acid and certain blackish extractive matters. Concentration of the solution was formerly carried out in lead-lined wooden

vessels containing closed steam coils. Evaporation should be rapid and the temperature should never exceed 65° to 70° . When the liquid reaches 45° (sp. gr. 1.3), almost all the calcium sulphate previously remaining in solution separates; the clear liquid is then syphoned into a similar vessel underneath, the concentration being continued until a crystalline skin forms at the surface of the liquid, which is next transferred to wooden crystallizing vessels, the inner surface of which is polished with plumbago. After two days, the dark-brown mother liquors are removed and the yellowish-brown crystals centrifuged. In order to separate traces of dissolved iron from the mother liquor, this is treated with a little potassium ferrocyanide and filtered; two or three further crops of dark-coloured crystals are obtained, the very dark mother-liquor finally obtained being added to fresh lemon juice.

MODERN METHOD PRACTISED IN EUROPE.

In large factories the citric acid solution, forced from calcium sulphate by filter-pressing, is concentrated in vacuum apparatus, just as in sugar manufacture, the density 45° to 50° Be in the hot being attained. In this way the temperature does not exceed 60° to 65° and with a triple-effect apparatus not only rapidly, but also economy of fuel, is attained.

In order to remove the calcium sulphate remaining in solution, the concentration is effected in two phases; in the first to 26° to 28° Be, the liquid being then cooled in suitable vessels in which the gypsum deposits; the residual liquid is then concentrated further to 48° to 50° Be. This liquid is discharged into the

crystallizing vessels, which are of lead-lined wood and of large surface; the mother-liquors are re-concentrated and recrystallised two or three times, and are finally worked up to crude calcium citrate. The blocks of crystals left in the crystallizing vessels are broken up with wooden mallets and centrifuged.

The brown crystals first obtained are refined and decolourised by dissolving them in rather more than double their weight of water (to a solution of 20° Be) and boiling the solution with animal charcoal previously treated with hydrochloric acid.

The hot liquor is filter-pressed under low pressure until it becomes clear and free from particles of charcoal. The filtrate is concentrated in a vacuum at about 60° to 65° until crystals of citric acid form, and is then heated to 90° and discharged into lead-lined crystallising vessels, in which it is stirred at intervals so as to obtain small crystals; after 48 hours these are centrifuged and washed in the centrifuge with pure citric acid solution, just as is done with sugar.

If chemically pure citric acid free from metals is required, the concentration is carried out in thickly tinned vessels and the crystallization in wooden vessels; the traces of iron present are eliminated by addition of a little potassium ferrocyanide and sodium sulphide.

In all the washing and refining operations, pure water with little hardness is always employed.

MANUFACTURE OF VINEGAR.

VINEGAR is a dilute form of acetic acid having a flavour that varies according to the source from which it is obtained. It is extensively consumed in the preparation of pickles and sauces, and as a table condiment. It is also used in medicine and in the manufacture of ink. Since it affords such a large profit that merchants and grocers who retail vinegar should always have it made under their own eye.

The materials generally used in manufacturing vinegar are cider, wines, decoctions made from malt, sugar solutions, diluted alcohol mixed with malt infusion, glucose and molasses.

The first step in the manufacture of vinegar is the preparation of an alcoholic wash, containing also sufficient nutriment for the acetic bacteria.

In the production of spirit vinegar a diluted spirit derived from potatoes or maize starch is mixed with a small proportion of phosphates and ammonium salts. Wine vinegar is made from diluted wine, and cider vinegar from sour cider or from apple juice. Any substance capable of fermentation so as to yield an alcoholic liquor is also capable of acetification under suitable conditions, but the bulk of vinegar now manufactured from malted or unmalted grain or from a mixture of cereals and fermentable sugars.

The malt or malt and grain is infused in a mash-tun or saccharified in a "converter" by means of a dilute acid, and the alcoholic wash thus produced is clarified and acetified as subsequently described.

The most suitable form of mash-tun for vinegar brewing is one provided with rakes, and also with a steam coil beneath the perforated false bottom, to enable the temperature of the mash to be raised gradually from a relatively low temperature. If a mixture of malts and unmalted grain is used, a malt of good diastatic power may be obtained, but when malted barley is being used alone a malt of low diastatic power will give good results.

The malt or mixture of malt and grain is crushed and is then passed through a Steel's mashing machine into the mash-tun, with the calculated quantity of water to give a mash at a temperature of about 120°F. The temperature is then very slowly raised by means of a steam coil at the bottom of the mash-tun. After the temperature has in this way been gradually brought upto 152°F, while the articles have meanwhile been kept in constant movement by the rakes in the tun, the mashing is continued until the liquid no longer gives a blue coloration with iodine

The infusion is then drained off and a second mash is given with a smaller quantity of water at 155°F, this extract being drained off as before. Finally the goods in the tun are washed from above with water at 155°F, which is distributed over their surface from the arms of a revolving sparge. The united extracts are cooled to about 70°F, by means of refrigerators and are then fermented with yeast.

The wort obtained in this way is readily fermentable, but the use of low-

dried diastatic malts and low temperatures for mashing has the drawback of yielding vinegars which are sometimes very difficult to free from a slight degree of cloudiness. This turbidity appears to be partly due to albuminous substances, which can be coagulated by boiling and afterwards removed by filtering. But this method is not followed by the vinegar maker because in that case the dextrins are converted into unfermentable substances and thus it reduces the yield of alcohol and subsequently the acetic acid.

The usual practice is to use a malt that has been dried at a medium temperature. This will give a wort which in fermenting yields the highest percentage of alcohol.

THE CONVERSION PROCESS.

Instead of the starch of cereals being saccharified by the diastase of malt, a process in which a dilute mineral acid is used as the hydrolytic agent is employed. Maize or rice are the chief materials used in this process for making worts.

In converting the starch into fermentable dextrose, the grain is mixed with dilute sulphuric acid (about 3 per cent. strength) in a closed iron vessel, where it is heated for several hours by steam under pressure until a sample of the liquid no longer gives a reaction for unconverted starch.

The contents of the converter being acid are neutralised with lime and chalk and are then drawn off cooled, and fermented in the same way the wort obtained by mashing.

As it leaves the filters the wort will show a specific gravity of about 1.070, and, if a strong vinegar is required, is

pitched with yeast directly without any dilution. It is more usual, however, for the liquid to be diluted with water to a specific gravity of 1.055 to 1.060 before fermentation.

ACETIFICATION OF THE WORT.

In this process the alcoholic wash or wort has been subjected to the combined action of the acetic bacteria and atmospheric oxygen to convert it into vinegar. The oldest method of effecting this change was by exposing the casks partially filled to the air, with their bungs drawn out. This method is now obsolete as it takes too much time for perfect acetification and is much depended on the atmospheric condition. The modern practice of acetification is carried on in vats instead of casks. These vats are provided with perforated false bottoms, on which rests the fillings of beech wood shavings reaching nearly to the top of each vat. Over the shavings a few inches below the cover is a perforated wooden plate. The beech shavings are boiled with water and then soaked in strong vinegar, before filling into the vat. Their purpose is to spread the liquid into thin films, so that the oxidation may be rapid.

The cooled alcoholic wash or gyle as it is commonly called, impregnated with acetic acid bacteria, is pumped from the bottom of the vat and discharged into the funnel at the top which is boxed in to prevent loss by evaporation. The liquid flows down the tube, enters the sparger, which revolves on a pivot. In the arms of the sparger are a number of holes through which the liquid rushes, thus causing the sparger to revolve steadily and uniformly sprinkle the surface of the basket-work. The liquid comes in con-

tact with the current of air passing up through the mass, the alcohol is rapidly oxidised into acetic acid. The temperature within the vat rapidly rises, causing the air to rise and escape through the openings in the top, while fresh air enters through the holes in the sides of the vat thus causing a continual circulation of fresh air within the vessel. The temperature is kept as near 85°F as possible, regulating the temperature of the air admitted into the vat. If allowed to go too high, much alcohol is lost by evaporation and the vinegar is weak. Too rapid an air current also evaporates much alcohol. The vinegar formed collects under the false bottom, and flows out through a syphon. To increase the strength of the vinegar the process is repeated with a small quantity of alcohol.

Exact regulation of the strength and flow of malted liquid, and of the amount of air admitted, is essential to successful working. Considerable alcohol is lost by evaporation. The air leaving the converters is often washed with pure water to recover the vapourised alcohol and acetic acid. If vinegar eels appear it is customary to kill them by adding hot vinegar until the temperature of the vinegar running out of the cask has risen to 120°F.

FILTRATION.

After leaving the acetifiers, the crude vinegar is pumped into store vats, where it is allowed to remain for several weeks or months to mature. During this storage period it deposits albuminous matter, bacterial cells, etc., and undergoes partial clarification. The liquid is then syphoned to filtering tanks filled

with paper pulp, through which it percolates.

CLARIFICATION OF VINEGAR.

The persistent cloudiness, which occurs in certain vinegar is sometimes more rapidly removed by a process of clarification than by filtration. The methods employed are sometimes mechanical and sometimes chemical. In the first case an insoluble substance such as kieselguhr is stirred up with the vinegar and as it slides it carries down with it the albuminous particles to which the turbidity is due.

In chemical methods the albuminous substances may be precipitated by the addition of a gelatinous agent such as isinglass. It is next sterilised.

STERILISATION OF VINEGAR.

After filtration or clarification, vinegar will still contain acetic bacteria and when exposed to the air will soon become coated with a zoogloal film. This can be removed by long continued storing which is very troublesome to manufacturers.

Since all the species of acetic bacteria perish at a relatively low temperature, it is sufficient to heat the vinegar to 150°F. This process of sterilisation is most simply effected by passing the vinegar through a coil surrounded by a tank of water, which can be heated by steam to the sterilising temperature. On leaving this heating tank the vinegar is passed through one or preferably two other coils chilled by a current of cold water and is thus cooled down nearly to the normal temperature and leaves the sterilising apparatus without any appreciable loss of acetic acid. Finally the vinegar is bottled and ready for the market.

MANUFACTURE OF BARLEY.

BARLEY, like wheat, is one of the most ancient of cultivated crops, but the two-rowed barley (*Hordeum distichum*) alone has been discovered in the wild state in several parts of Central Asia. The six-rowed barley (*H. hexastichum*) or bigg, which is the staple of Indian cultivation, has not been discovered in the wild state, though this is the variety which was cultivated in Europe, Asia and Africa, in very old times. The four-rowed barley (*H. Vulgare*) is the staple of European cultivation now. Probably the four-rowed and six-rowed barley are derived from the wild two-rowed variety. Indian barley on analysis is found to be richer in albuminoids than English barley.

CULTIVATION.

Barley is grown to a small extent all over India and chiefly in the United Provinces either by itself, or mixed with wheat or gram, or with peas, or lentils. The most favourite mixture is barley and gram. Barley and wheat as a mixture is not so popular, but barley as surface feeder and wheat as a sub-soil feeder, may be grown together in rich soils. Rape, mustard, and linseed are also grown along with barley. The soils on which it thrives best are light and sandy, and, as a rule, not highly manured. Only 10 to 12 maunds of cow dung, 6 to 7 seers of bone dust and 5 to 6 seers of sulphate of ammonia may be applied for every bigha so as to obtain a good harvest. To prepare the soil the land should not be ploughed deeply but it must not contain any lump. The number of ploughings generally required before sowing varies,

but four would be a fair average. The seeds are sown in September or October by the plough-furrows, the surface of the ground being subsequently levelled and beds for irrigation formed. The seed-rate runs from about 19 to 20 seers per bigha. A little more seed is required for barley than for wheat, but 19 to 20 seers per bigha is too liberal an allowance. Seed properly stored and protected against weavils germinate properly and smaller quantities of such seed are sufficient; 14 to 15 seers of barley should be ample to sow a bigha.

Barley is a hardier crop than wheat so that irrigation is not generally required but in places which enjoy a tolerable certainty of rain it is rarely resorted to. Little weeding is also required. One hoeing and watering with a mixture of 10-seers of saltpetre and 5 maunds of water per bigha may be applied with great advantage when the plants are above 6 inches high. In Bengal no irrigation is practised for barley, but this does not affect the growth of the plant owing to climatic condition. The crop is left very much to itself till March-April, when it is reaped before the grains are very ripe. The cut sheaves are made to stand with ears upwards, near the threshing floor and when the grains are quite dry they can be threshed or flailed out.

BARLEY POWDER.

Of the various uses barley powder is largely used for food purposes in this country. The process of cleaning barley for food purposes is generally carried out by pounding in wooden mortars

and winnowing or by heating with a flat board. But before this the grain is first steeped in water for a few hours and then it is exposed to the sun to dry. When the husk is removed the cleaned grain is fried over a mild fire and then it is ground to powder by means of wooden mortars. The powder thus prepared is passed through a fine cloth or sieve.

PEARL BARLEY.

Pearl barley is barley deprived not only of the outer skin but also a portion of the grain leaving a small round kernel while pot barley is deprived only of its outer hard cuticle from the grain. Both these preparations are made by means of the same kind of mill but the pearl barley received a greater degree of the grinding process.

In the preparation of pearl barley the grain is properly dried in kiln at a temperature not exceeding 105°F. The kiln usually employed for the purpose, has only one floor made of tiles, and heated by means of a closed furnace below. The grain is spread upon the kiln floor about 12-18 in. deep and turned frequently until the moisture is totally removed. The temperature of the kiln is gradually raised to 105°F and maintained constant till the desired results are obtained. It is then submitted to the grinding operation. The simplest form of grinding mill resembles a common flour-mill with two mill-stones, each about three feet in diameter.

One fixed and the other revolving over it. The upper stone moves parallel to the lower and so close to it as to rub without crushing the grain which passes between them. The mill is fed by a

hopper, through the central opening, as in ordinary corn mill. The stones work in a cylindrical box, the top of which is of wood, with a circular opening corresponding to that of the stones. The circumference of the box is of thin iron plates, provided with numerous holes, the rough surface of which is inside the box and assists the operation of removing the skin from the barley. Before being placed in the hopper, the barley is sprinkled with water so as to moisten it slightly and turned three or four times, in order to loosen the skin. It is then slowly introduced into the hopper to the action of the stones; it enters the grooves in the upper-stone, and is whirled round at the rate of about two hundred revolutions per minute, thus breaking the hard cuticle of the grain and not crushing it. It is then driven off with considerable force against the grating surface of the cylinder, which together with the air-current produced in course of rapid movements wholly removes any remaining skin from the grain. From the cylinder it is let out through an opening and falls on a sieve where the kernel is separated from the bran. The greater parts of the fine particles of barley escape through the holes in the cylinder during the process; therefore, to avoid this waste a cloth is fastened round the cylinder and guides the meal into bin below. The pearl barley thus obtained is then reduced to fine powder by grinding in a mill and the product is packed in air-tight tins and sent to the market as patent barley.

GLYCERIN SOAP-II.

METHODS.

IT has already been stated, that there are three methods for the preparation of transparent soaps. (1) The old fashioned and the original process which is still largely used is, in which a tallow-rosin soap (containing 15-25 % rosin) or primrose soap (yellow bar soap) is dissolved in alcohol, the bulk of the alcohol is distilled off, and the residue run into moulds. In this method, the soap is first chipped into thin slices, dried (and preferably powdered), and then dissolved in industrial methylated spirit in the proportion of 5 gallons per cwt. of soap, by warming under a reflex condenser to about 150°F. While the soap is dried, it being in contact with air, the slight excess of caustic soda contained in the soap is converted into sodium carbonate by the action of oxygen present in air. The soap being soluble in alcohol is dissolved by it, and sodium carbonate, silicate or other impurities that are insoluble in alcohol remain undissolved. After allowing to settle, the clear soap solution is drawn off into another vessel, glycerin (not more than 30 %) is then added, and as much as possible the alcohol is distilled off and recovered, leaving a thick viscous mass which is run into moulds in the form of bars. The bars are then cut into cakes when cold, polished with a moist cloth, and finally stamped. At this stage the soap is turbid, but on keeping for several months at a temperature of about 95°F, it becomes transparent. Thus prepared, the soap acquires a dark reddish brown colour, due to rosin without the addition

of any colouring matter but if the soap is desired to be coloured, the colouring matter may be incorporated into the soap after distilling off the alcohol, and just before it is run into moulds. This practice is probably purported to prevent the recovered alcohol from becoming coloured, but experience says that the introduction of colour before the alcohol is withdrawn is rather better to ensure uniform colouring. It should also be remembered here that as sodium carbonate and silicate have no utility nor do they enter into the composition of the soap, being the undissolved precipitate, it is better for us to employ a neutral tallow-rosin soap instead of barsoaps (which invariably contain fillers such as sodium carbonate and silicate), as was used in old fashioned method.

SECOND METHOD.

In this method suitable quantity of tallow, coconut oil, and castor oil usually in the proportion of 2:2:1 is run into an iron or copper vessel, heated and mixed with the requisite quantity of lye, preferably at 35° or 36°B, and set aside for some time. Within 20 minutes saponification begins when it is placed on a water bath and boiled stirring occasionally. When saponification seems to be complete, syrup (freshly prepared with white granular sugar 40 to 50 % on the total fatty stock and its equal quantity of water), or glycerin (20 to 30 %), or both in suitable proportion, and colouring matter, if any, are incorporated. Later on, industrial alcohol (30 to 40 %) is added, and the soap boiled in mild heat, the vessel being covered up, so that the

spirit cannot escape freely. After some-time the fluid soap becomes quite clear and transparent, and if on test found satisfactory, perfume is added, and the soap run into special moulds. Now, in order to test the soap a few drops of the fluid soap may be put on a glass or porcelain plate. On cooling, the soap will be found transparent, hard, colloidal, and free from any greasy mark or dull appearance. On taste it will give a slightly biting feel after $\frac{1}{2}$ a minute or nearly so. Should it, however, appear pasty, or greasy spot be found on the side or surface, or the sample taken which was at first clear and transparent gradually turns opaque, the soap invariably contains unsaponified fat, when it should be boiled further, adding a little more lye, if necessary, until the free fat thoroughly combines. If the sample gives a pronounced biting taste, excess of alkali is presumed, in which case it is to be treated with a neutralising agent. The permissible limit of free caustic alkali (Na_2O) in a first class toilet soap, however, is 0.1%. It may be asked here that while caustic soda is taken just as required under calculation how can there be an excess or deficiency? The answer is, commercial caustic soda is never cent per cent. pure, nor always uniform in strength. In case of fatty stocks also the same grade of fats and oils differs considerably in saponification value, and unless every batch is previously analysed in the laboratory to determine their fatty acid contents,—which is never practised nor is convenient for a soap maker to do so, this difficulty can by no means be got rid of, however-much judicious calculation may be made in

Vol. XXV. No. 298.

finding out the exact quantity of alkali required for the purpose. In the first method, the soap undergoes the settling change by which it is automatically neutralised discarding even the impurities that might have been contained in both fats and alkalis. It should also be noted that in this method a little excess of alkali beyond calculation becomes necessary to be taken at the first instance to ensure complete saponification—a little short of which is enough to affect transparency. But once the fatty stocks are totally saponified there is no harm in neutralising the excess alkali by employing a suitable agent,—nay it is imperative where a high class toilet soap is intended.

Of the various neutralising agents those most commonly employed are coconut oil, oleic acid or much better stearic acid, rosin, boric acid, and sodi. bicarb. Coconut oil by its saponification removes caustic soda. Oleic acid, stearic acid, rosin, and boric acid neutralise caustic and carbonated alkali both. Sodi. bicarb, while destroying caustic soda increases the carbonate. Coconut oil, oleic acid, and stearic acid tend to make the soap liable to go rancid on keeping as there is every possibility of certain portion of them remaining unsaponified. Rosin, of course, is free from this defect but the uncombined portion of it will impart stickiness to the soap. In employing boric acid if there be an excess, it will go, beyond neutralising the free alkali, to liberate fatty acids. Considering all these drawbacks, the most suitable agent for our purpose would probably be sodium bicarbonate. It will no doubt increase the carbonate of the soap but the quantity

of free caustic left in the soap being insignificant the convert carbonate can by no means exceed the permissible limit which varies within very wide limits (maximum 5 %), according to the quality of the soap. Hence, the application of sodi. bicarb. in this case, is considered much less harmful than any other neutralising agent. To properly neutralise a soap, a sample should be taken and tested for the proportion of free alkali both as caustic and carbonate, and from these results, and a knowledge of the total quantity of soap, the amount of neutralising material required may be accurately calculated. But this being infeasible for practical purposes, we should use sodi. bicarb. little by little testing on each addition by litmus paper, phenolphthalein, or, by the tongue.

THIRD METHOD.

Soap, made by this method is a cold process one. Formerly, such soaps were made by adding about 20 % glycerin to the fatty matters before saponification, and after thoroughly crutching with the requisite quantity of caustic soda lye, running in some 30 to 40 % industrial alcohol, and again well mixing. The soap was then allowed to stand for an hour or two for saponification to proceed, after which it was transferred to special frames, smaller than those ordinarily used, and of steel in order to induce rapid cooling. For cheapness glycerin was subsequently replaced by syrup prepared by 1 part of cane sugar dissolved in 1 part of water and to make it further cheap, alcohol was altogether dispensed with by employing castor oil over 33 % on the total fatty stock in combination with syrup. It should be remembered

that castor oil makes the soap soft hence, too much cannot be employed without impairing the consistency.

The modern practice is,—a stock of say 5 parts each of coconut and castor oil and 4 parts of tallow is mixed with half its weight of strong caustic soda lye usually at 37°B, and thoroughly crutched until it begins to thicken. The pan is then covered up. Within two hours saponification becomes complete signified by high temperature rising steadily to a maximum, due to chemical reaction. The syrup which may contain 5% of soda crystal is meanwhile heated to 170°F, and colouring matter, if any, in solution (at 170°F) are gradually added to the soap as soon as saponification is complete. The soap also is raised to this temperature, if necessary, by closed steam or water bath process. When alcohol or glycerin is dispensed with, about 8 parts of syrup will be required. The whole mass should be thoroughly crutched until homogeneous, when it is again set aside for an hour or so, after which a fob will appear on the surface of the soap beneath which the soap will be found clear and transparent, uniform in colour, and firm. If the soap appears transparent but not sufficiently firm, it may be hardened by the addition of a little soda ash, if not quite clear, a further small quantity of syrup may be added. When the firmness and transparency are satisfactory the soap is allowed to cool down to about 145°F. Then perfume is added, and mixed well and the soap is rapidly transferred to small steel frames and cooled as quickly as possible. For a layman, or one with meagre knowledge in the art of manufacturing this class of

soap it is advisable to use alcohol and syrup both to ensure transparency. In this case about $3\frac{1}{2}$ parts by weight of 95 % industrial alcohol should be added immediately all the alkali has been incorporated. When glycerin and syrup are used without alcohol, $2\frac{1}{2}$ parts of glycerin should be admixed with such combination of fatty matters as above, prior to saponification

—R. GHOSE. (Soap Expert.)

PREPARATION OF ORANGES FOR SHIPMENT.

A RECENT paper in Industrial & Engineering Chemistry by J. R. Winston, of the Bureau of Plant Industry of the United States Department of Agriculture describes the modern methods employed to retard decay in orange shipment, and to improve the appearance of the fruit intended for the market. Then include (besides the familiar refrigeration) the use of antiseptic washes which destroy organisms causing decay, the application of processes which retard natural biochemical changes in the fruit and the application of blanching and polishing treatments which improve its appearance.

The first step in the preparation of oranges for market is the determination of maturity. Because the earliest shipments command the highest prices, an incentive to collect in mature and under sour fruit is ever present. Lack of restraint in this matter may eventually kill the market, so that now a days, maturity standards have been enforced by the larger fruit producing companies. The standards vary for different kinds of citrus, and in different growing areas, but

they are usually based on measurement of the ratio between total soluble substances (namely sugars) to acids in expressed representative juice. For Florida oranges, for example, the accepted standard ratio is 8 to 1 as determined by chemical tests.

The chief organism causing decay in citrus fruits are two species of *Penicillium*, viz: *P. Italium* and *P. digitatum*, known as blue moulds. The latter is able to infest fruits only at places where the rind is injured, but the first may spread from points of contact in the pack. Careful handling and packing greatly reduce damage by these organism. The use of antiseptic washes also aids materially in reducing their incidence. The particular wash which has given most satisfaction is an eight per cent solution of borax applied soon after harvesting and before blanching. Others are boracic acid solutions and solutions of sodium carbonate. Whilst the two last named destroy blue mould, borax destroys stem and rots as well. After treatment, the fruits should be washed in soft water.

Blanching is usually effected by the controlled application of ethylene gas. The process has been thoroughly investigated, and the exact conditions of operation have been carefully worked out. They are sufficiently well known to the trade not to require re-stating.

Polishing is the final applied to oranges and other citrus fruits before packing. The fruits are passed across horse-hair brushes, and frequently some substance is added to increase the surface shine. Thus, rosin, added to the washing solutions, serves this purpose, but a mixture of paraffin wax with a mineral oil applied in a special machine furnishes a

successful alternative. An emulsion of carnauba wax, and as a dip, is effective where brushing cannot be applied to delicate fruits, such as tangerines. The most widely used polishing method, however, consists in brushing on to the fruits a small quantity of solid paraffin wax, introduced by pressing a bar or the material against the revolving brushes.

PIN-MAKING.

THE industry of pin-making is one of long standing and has reached the present shape after passing through many stages. It involves many complexities which have been successfully combated with. Below is given the method of manufacturing pins by the installation of various machines which take in wires at one extremity and deliver perfect pins in continual stream at the other.

The old process of manufacturing pins though now out of date is instructive inasmuch as it will assist the reader to comprehend the difficulties to overcome in substituting the automatic labour of machines of iron and steel in place of skill of human fingers. The method adopted now-a-days with its elaborate machineries is just the outcome of the old one. So it is quite justifiable to touch upon the old process.

The most important part of the old process was that of drawing wires of the same size. It consisted in pulling the wire through tapering holes in a steel block, each successive hole being smaller than the last, thus bringing the wire gradually down to the gauge and lengthening it out. The wire thus drawn became of uniform thickness and was wound round a cylinder. The next thing was to straighten the wire. The coil of wire was slipped on to a reel of conical shape.

The wire was then pulled with a pair of pincers and conducted first over the outside of a number of pegs placed in a zig-zag order upon a board and finally between two rows of others set in line to act as guides. The wires were then out into lengths sufficient for six pins. A number of them were put into a spindle and their extremities were pointed by means of files. They were then broken at the middle and their nibs were again pointed. Thus small pins were obtained pointed at one end and blunt at the other. The next difficulty was to put small heads on the shafts. In order to form the heads a wire was wound round a wire of the same gauge as the pin closely and evenly from end to end about 40 ft. It was then slipped off and was chopped up into little coils of two or two and a half turns. These were put on the blunt ends of the pins and were rivetted by means of a little die. The pins were then whitened by means of boiling them in water with grains of metallic tin and a certain quantity of bitartrate of potash. The pins then remained to be stuck into paper. A comb was introduced into a heap of pins and was raked by which means all the heads were got one way and then a push was given with the back of the comb against the heads and every pin entered the paper in its proper place.

So much for the old process. The main difficulty of the old method was to keep the pin's head properly on its shoulder. Various patents have been taken and efforts are still being made to perfect the machines as much as possible. It will be too long to describe the many modifications of the present machine. We must be content with endeavouring to convey some notion of its ingenious construction.

The wire as we have previously said, is drawn into the machine direct from the coil passing through straightening pegs. A pair of heavy iron fingers close upon it when it has reached a certain distance and hold it while three quick chopping blows are administered upon its head, dubbing it up into perfect and comely shape. It is needless to say that the striking end is of the converse shape at the end of the pin. A cutting instrument then comes into play and cuts off the pin just as the iron fingers uncloset and let it drop into an iron trough lying down the side of the machine at an angle of 45 per degrees or thereabouts. The bottom of this trough is not closed but is one long slot, just wide enough to let through the shaft of the pin but not the head. The pins therefore soon assume an upright position and travel down the incline, hanging by their heads simply by their own gravity and the shaking of the machine. When they get to the bottom they turn a corner in regular order, the trough being continued and follow each other in single file along the front of the machine where the pointing wheels are revolving. As they pass along the slower gradient of this part of the trough assisted by the vibration and by the pressure of those behind, they come successively in contact with coarse and smooth rotary files and become beautifully sharpened by the time they reach the end and drop off into a pan.

The motion of the striking hammer and the vibration of the machine are directed by cams—wheels with lumps upon them—which come into play at the proper moment by the revolution of the spindle. The shaft of the striking punch slides easily between journals and its other extremity is furnished with a roller. A spring underneath keeps this roller pressing on the periphery of a wheel fixed on the spindle. This wheel has three lumps and as it revolves it shoots forward the striking punch thrice.

The pins are then reduced to order and marshalled in a row by machines of American invention and are struck into paper.

UTILISATION OF WASTE MOLASSES—A SUGGESTION.

ALL those who are interested in the future of the cane-sugar industry fully appreciate the necessity of a satisfactory solution of the problem of the utilisation of waste molasses produced in a sugar factory. Various suggestions have been made from time to time about the commercial uses to which this product can be put, for instance the preparation of power alcohol, caramel, cattle food, ball tobacco, etc., etc., have all been suggested, but its use as a binding material in the manufacture of charcoal briquettes, does not seem to have attracted any attention.

Charcoal is a commodity of great commercial and domestic use. Immense quantities are being consumed practically in every town. It is produced by burning cheap quality of wood which is found abundantly in forests and usually serves no other commercial purposes. The future of the production of charcoal as a forest industry is assured if the problem of its profitable transport can be satisfactorily solved. It is bulky for its weight, and being brittle is very liable to damage and loss during transit. One way of solving this problem is to convert it into briquettes, which are heavier, bulk for bulk, than the charcoal, from which they are manufactured, offering thereby a large saving in the cost of transport, while damage and subsequent loss in handling is practically negligible, provided a really efficient binder is used in their manufacture. The real problem therefore is the search for a good binder. Molasses appears to be admirably suited for this purpose. It possesses good adhesive power and burns readily. It can be obtained very cheap from the sugar factories and is therefore not expected to affect the cost of manufacture to any large extent. The use of molasses as a binding material in the manufacture of charcoal briquettes appears to be helpful both to the sugar industry and the charcoal industry.

—M. Q. DOJA.

Statistical Position of Sugar in Java.

FEARS OF HEAVY DUMPING INTO INDIA.

AT the time of budget in march last, there were indications of smaller imports into India during the current year owing to recent rapid growth of the indigenous sugar industry. Sir George Schuster, Ex-Finance Member, therefore, put the estimate of imports at about 110,000 tons to yield customs duty Rs 2,05,00,000 as against actual receipts of Rs 4,72,04,000 and Rs 6,84,79,000 during 1933-34 and 1932-33, respectively.

Java, however, appears to have planned to export about 300,000 tons to India, and considering the volume of recent business obtained from India at reduced prices, it is most likely that she will be able to carry out her plan in full. As a matter of fact, the amounts of customs duty collected by the Government of India during the seven months ended October, 1934, already exceed the amount budgeted for the whole year by over Rs 39 lakhs.

It is thus abundantly clear that large quantities of sugar are being dumped into India by Java at decreased prices. In April, 1933, i.e., just a little over a year and a half ago, Java's selling limit for the west coast ports of India was F. 6 per 100 kilos. Since then the limit has been lowered from time to time as and when circumstances compelled such reductions, and to-day Java sugar could be purchased at F.2.85 per 100 kilos, which means that Java has deliberately been cutting prices for the Indian market irrespective of the cost of production.

Java has, however, reasons for its uneasiness. Unsold stock of sugar at the

various ports of Java are estimated at about 2½ million tons (roughly equivalent to total consumption of sugar in India for a period of two years and a half), and Java is, therefore, compelled to dump her sugar in the various markets in order to avoid total or larger loss which would result if she allowed her sugar to remain stocked in Java and deteriorate in quality with the passage of time.

To what extent Java will be able to succeed her attempts to dispose of her Sugar stocks, even at reduced prices, is, however, a matter of conjecture. After the war, the countries that were Java's best customers were induced by the low prices to protect their domestic industries, and this protection was liberal enough to stimulate further expansion, with the result that Java is now finding her former markets totally or partially closed to her.

The comparison of Java's exports to some of her important customer-countries during 1933-34, with those during 1929-30, is set forth below:—

	1933-34.	1929-30.
	Tons.	Tons.
Europe	— 140,413	292,347
Singapore	— 49,760	79,065
Penang	— 213, 74	24,762
British India	— 269,089	1,023,776
Siam	— 26,951	41,255
Hongkong	— 185,491	250,354
China	— 82,240	364,408
Japan	— 127,467	210,917
Korea	— 16,009	25,954
New Zealand	— 67,642	7,804
Other countries	— 14,862	33,816
Total	— 1,091,298	2,354,458

It will be observed from the above table that Java's total exports of sugar to all countries during 1933-34, equal to what India alone used to buy from her five years ago. Since 1931-32, however, largely due to the substantial protection granted by the Government of India to the indigenous industry, the protection of white sugar has steadily been increasing, thus narrowing the difference between production and consumption to represent margin for imported sugar. The following table shows the production of sugar in India direct from cane, by modern factories, as well as imports of sugar from Java, during the last five years. It should, however, be pointed out that in addition to the production of white sugar as shown below, considerable quantities of sugar are manufactured from cane by small scale open pan factories (about 275,000 tons) and also refined from gur in vacuum pan refineries (about 100,000 tons):

	Production of white Sugar in India, direct from cane.	Java's exports of sugar to India.
	Tons.	Tons.
1929-30	89,768	1,023,776
1930-31	119,859	1,028,951
1931-32	118,581	514,714
1932-33	290,177	425,727
1933-34	453,965	269,089

During 1934-35, the difference between production and consumption in India representing margin for imported sugar will be about 121,000 tons and this will be reduced to only 13,000 tons during 1935-36. The season 1936-37 is, however, expected to produce about 100,000 tons more than the total consumption of the country. Thus Java's scope in the Indian market is gradually narrowing

down and in a few years' time Java sugar in the Indian market will be but a memory and a name.

Another important customer-country of Java, which is diminishing her sugar purchase owing to the increase in domestic production is Japan. Japan's consumption of sugar, however, still exceeds its production by about 150,000 tons (production about 800,000 tons and consumption about 950,000 tons) and with a view to securing the Japanese market to this extent, the Java sugar interests are reported to be negotiating with the Japanese authorities. The basis to the exact object of the negotiations is not clear, but apparently Java seeks agreement with Japan on a system of quotas covering the inter-change of a variety of goods. There is mention of the licensing of "the 56 articles" imported from Japan and it is inferred that these are to be admitted in licensed quantities in return for Japan's undertaking to buy a certain amount of sugar and other exports. It is, however, most likely that such an agreement, if made, would benefit Java permanently, as Japan is so industrially-minded that in a few years' time, Japan would be producing her own sugar to meet the entire domestic consumption. Similarly, China is also beginning to set about industrialising herself and will probably be producing her own sugar at not very distant date.

The prospects for the Java sugar industry thus appear gloomier than ever and it is a foregone conclusion that the industry will never regain its former level. It is also easy to imagine the harm done to the economic structure of that island by the sudden and the

unexpected fall of the industry. That the sugar trade in Java is approaching close to disaster will be seen from her grave statistical position given below:—

	Production.	Exports.
	Tons.	Tons
1929-30	— 2,941,790	2,354,458
1930-31	— 2,969,180	2,141,532
1931-32	— 2,843,152	1,543,153
1932-33	— 2,610,782	1,331,473
1933-34	— 1,500,000	1,091,298
1934-35*	— 615,000	—
1935-36*	— 500,000	—

* Estimated.

It will be seen from the above table that the gradually diminishing exports have led to measures being adopted for restriction of production. The production estimated during the 1934-35 season appears to be the smallest during the last 35 years, and the estimate of 500,000 tons during the 1935-36 season is only one-sixth of the actual outturn during 1929-30. There is also a huge stock of unsold sugar estimated at about 2½ million tons, and assuming that the future crops will not substantially exceed the present calculations, Java would still take, under the present state of affairs, over three years to come out of the stock surplus. This supposition is, however, based on exports of at least a million tons annually but, as described above, there are indications of decreasing demand for Java sugar with the passage of time.

Considering, however, the fact that Java enjoys the reputation of having the cheapest and most efficient methods of production and that sugar is the chief product of the country, it will not be surprising if, on expiration of the Chadbourne agreement in September next year, Java will embark upon a scheme of producing the cheapest sugar and of dumping it in the various parts of the world at unimaginable prices with a view to give employment to a part of her population.

There is also a further fear that rather as a matter of policy than of

absolute necessity Holland, and with it Java, might go off the gold standard and if this happens the price of Java sugar will witness a considerable further fall. Such a state of affairs, if brought about, will do a considerable harm to the Indian sugar industry.

It will be remembered that in July this year, a scheme has been drawn up to sell about 30 per cent. of the production of each province at far-off ports at 4 annas below Java parity with a view to shutting out imports of Java sugar from the very commencement of the season, and according to its present programme, the Central Marketing Board is expected to start functioning early in January. Such a course, i.e., of sending sugar at far-off ports, paying railway freight all the way and then selling it at 4 annas below Java parity, will naturally involve considerable sacrifice on the part of factory owners but, when the scheme was planned it was thought that this loss would more or less be recouped on account of the higher prices which will rule in the interior of the country as a result of the entire stoppage of the foreign imports and the elimination of internal competition on account of a substantial part of the production being sent to places served by ports where, in the absence of such an arrangement, it could never go.

The c.i.f. rate of Java sugar for the Indian ports was then Rs 4-1-0 per cwt. To-day, however, it is Rs 3-5 i.e. a decline of 12 annas per cwt. or Rs. 15/- per ton. This means an additional sacrifice which the factory owners will be called upon to make if the planned Central Marketing Board starts functioning. The quantity suggested to be sent to ports is 185,000 tons and the additional sacrifice at Rs. 15/- per ton thus comes to Rs 27,75,000. Even with all these sacrifices, chances to shut out imports of Java sugar entirely appear to be remote as it seems that the "NIVAS" is out to meet any competition and sell sugar at any price. Doubts are expressed in certain

quarters about the feasibility of the scheme now, particularly as, in face of the sudden and unexpected fall in prices of Java sugar with the added uncertainty about the future trend of prices, it is not likely to help prices in the interior to rise as was expected when the scheme was drawn up.

The position is thus really very serious, and the Government of India should, therefore, investigate the desirability of increasing the protection in accordance with the Sugar Industry Protection Act with a view to saving the industry from ruin and to maintaining it in its present state. In the interests of the agriculturists, as also the industrialists, it is necessary that the industry, which has been reared under a policy and promise of definite and adequate protection, should be saved, and that the Government should come to its rescue before any damage is done.

—By KEDAR NATH PASARI.

MINERAL WATERS.

ONE curious feature in connection with Indian minerals is the neglect of our numerous hot and mineral springs. To what extent the value of these is purely fanciful is a matter of small concern for the time being; for whether they have the medicinal properties claimed for them or not, there is no doubt that well-advertised mineral waters have an economic value and numerous varieties from Europe and Japan are scattered over India and are brought to the continual notice of the travelling public in all the railway refreshment rooms. The indigenous inhabitants have for many ages recognised a value in mineral waters and in the hot springs which are often charged with more than usual quantities of mineral matter. In many cases those have become sacred to the people and have consequently become places of resort for pilgrims from great distances. Of instances of this sort may be mentioned the occurrences at Manikarn in Kulu where

the pilgrims cook their rice in the hot springs emerging in the shingle beds close to the ice-cold stream of the Parbati river. The hot water is also led into the neighbouring temple and rest house for baths, being supposed to be of value for rheumatism. At Lasundra in the Kaira District and at Vajrabai in the Thana District, Bombay Presidency, springs of sulphurous water, having a temperature of 115°F are resorted to by pilgrims. Generally it may be said that hot springs, often sulphurous, are common throughout the Tertiary areas of Sind and Baluchistan on one side and of Assam and Burma on the other side of India with its constant associates of salt and gypsum. Other springs occur along the foot hills of the Himalaya in the Kharakhpur hills, etc., sufficiently well-distributed to permit of easy transport. The springs at Jawalamukhi in the Kangra District contain bromide and iodide of sodium and potassium; the water is said to be a remedy for goitre. The provincial gazettes contain sufficient references to those springs to guide private enterprise, but more might be done in the way of analysis of the waters, which would be as interesting from the scientific as possible from an economic point of view. The mineral water of Sitakund in the Kharakhpur hills is the only one which has been turned to account; this has some reputation in Bengal as table water. The springs at Tuwa on the line from Cambay to Godhra (Panch Mahals) are found to possess unusually high radio-active properties. Comparatively large emanations are found at Vajrabai and Unei also. Of course more use should be made of the therapeutic properties of these and other radium-containing springs.

The above extract from the report of the Geographical Survey of India will be an eye opener to our young men hunting for occupations. Marketing of mineral waters will offer lucrative occupation to them and advertisements of their properties will make them popular necessitating a larger supply.

IN THE INSURANCE FIELD.

BY OUR INSURANCE COMMISSIONER.

INDIAN INSURANCE IN 1932-33.

During the year under review 30 Indian companies were established with the object of transacting life assurance business. Of these new companies, 8 have been established in the Bombay Presidency, 5 in Bengal, 4 each in the Madras Presidency and Punjab, 3 in Bihar and Orissa and 2 each in United Provinces and Delhi, and one each in Central Provinces and Ajmer-Merwara. Statistics showing the paid up capital of the Indian proprietary companies which transact life assurance business only and the rates of dividend declared by them during the last ten years, disclose that, with the exception of the few oldest companies which have been transacting business for over 25 years, a large number of companies of over 10 years' standing have not yet been able to pay any dividend to their shareholders.

The total new life assurance business (excluding business on the dividing plan) effected in India during the year 1932 amounted to 139 thousand policies assuring a sum of Rs. 27½ crores and yielding a premium income of Rs. 1½ crores, of which the new business done by Indian companies amounted to 113 thousand policies assuring a sum of Rs. 19 crores and having a premium income of Rs. 1 crore. The share of the British companies in respect of new sums assured is Rs. 3½ crores of the Dominion and Colonial companies Rs. 5 crores and

of the single German company Rs. ½ crores. The average sum assured under the new policies issued by Indian companies is Rs. 1.674 and under those issued by non-Indian companies Rs. 3,376.

The total life assurance business effected in India and remaining in force at the end of 1932 amounted to 774 thousand policies assuring a total sum of Rs. 178 crores including reversionary bonus additions and having a premium income of Rs. 9 crores. Of this the share of companies is represented by 554 thousand policies assuring a sum of Rs. 102 crores and having a premium income of Rs. 1½ crores.

Some Indian life offices have extended their operations outside India, mostly in British East Africa and in the Near East. The total new sums assured by these offices outside India in 1932 amounted to Rs. 72 lakhs yielding a premium income of Rs. 4½ lakhs and the total sum assured including reversionary bonus additions remaining in force at the end of 1932 amounted to Rs. 1½ crores having a premium income of 21½ lakhs.

NEW BUSINESS SINCE 1923,

The total new sums assured by Indian Life Offices in 1932 amounted to Rs. 19½ crores and exceeded the previous year's figure by nearly two crores. The following table shows the new business effected since 1923 in each year and the total business remaining in force at the end of the year:—

Year.	New business written during the year.	Total business remaining in force at the end of the year.
	In Lakh Rs.	In Crore Rs.
1923	5,85	39
1924	6,89	42
1925	8,15	47
1926	10,35	53
1927	12,77	60
1928	15,41	71
1929	17,29	82
1930	16,50	89
1931	17,76	98
1932	19.66	106

INDIAN LIFE ASSURANCE INCOME.

The total life assurance income of the Indian companies exceeded the preceding year's income by a crore. The income during each of the last ten years was as follows:—

Rs. 2,49 lakhs in the year	1923.
Rs. 2,90 " "	1924.
Rs. 2,98 " "	1925.
Rs. 3,32 " "	1926.
Rs. 4,29 " "	1927.
Rs. 4,23 " "	1928.
Rs. 4,92 " "	1929.
Rs. 5,40 " "	1930.
Rs. 5,87 " "	1931.
Rs. 6,88 " "	1932.

LIFE ASSURANCE FUNDS.

The life assurance funds increased by nearly Rs. 2½ crores during 1932, and amounted to Rs. 25 crores at the end of that year. The average rate of interest earned on the life funds during the year was 5½ per cent.

FIRE MARINE AND MISCELLANEOUS BUSINESS.

The nett Indian premium income of all companies under insurance business other than life assurance during 1932 was Rs. 2½ crores of which the Indian companies' share was Rs. ¾ crore and that of the non-Indian companies Rs. 1¼ crores. The total amount is composed of:—

Rs. 126 lakhs from fire; Rs. 44 lakhs from marine, and Rs. 75½ lakhs from miscellaneous insurance business.

The Indian Companies received:—
Rs. 28½ lakhs from fire; deposits, cash Rs. 7½ lakhs from marine, and Rs. 28 lakhs from miscellaneous insurance business.

These figures do not take into account the premium income, chiefly derived from miscellaneous insurance business, of Clive Insurance Company of Calcutta, of which particulars are not available.

The non-Indian companies received—
Rs. 97½ lakhs from fire; Rs. 36½ lakhs from marine, and Rs. 47½ lakhs from miscellaneous insurance business.

ASSETS OF INDIAN COMPANIES

The total assets of Indian companies amount to Rs. 31½ crores. The bulk of the assets is invested in stock exchange securities at a nett value of Rs. 21½ crores. Mortgages, loans on policies and on stocks and shares are shown at 4½ crores; land and house property are valued at Rs. 1½ crores; deposit cash and stamps are shown at Rs. 1½ crores; accrued interest at Rs. ¼ crore, agents' balances and other outstanding items at Rs. 1¼ crore, and loans on personal security and other miscellaneous assets at Rs. ¾ crore. Investments of Indian companies outside India consist mainly of stock exchange securities and amount to Rs. ¾ crore.

INDIAN ASSETS OF NON-INDIAN COMPANIES.

The total assets in India of non-Indian companies amount to Rs. 37⅙ crores. The bulk of this amount Rs. 32½ crores represents the Indian assets of companies constituted in the United Kingdom and Rs. 5½ crores those of companies constituted in the Dominions and Colonies. The Indian assets of the American companies amount to Rs. 2½ lakhs, those of the Continental companies to Rs. 7½ lakhs, of the Japanese to Rs. 7½ lakhs and of the Javanese to Rs. ¼ lakh. Out of this total amount of Rs. 37⅙ crores, Rs. 33⅙ crores represent Indian assets of companies which carry on life assurance business in India either solely or along with other insurance business.

SMALL TRADES & RECIPES

Tin Plating Small Objects.

Screws, small machine parts or other items that must be protected from rust and corrosion may be given a resistant, bright tin plate by boiling them for 45 minutes in a solution made by dissolving aluminium sulphate 1 oz., cream of tartar 1 oz., and tin $\frac{1}{4}$ oz.; in water $\frac{1}{2}$ gallon. The boiling should be done in a zinc container. After removal from the bath, the plated ware should be dried in saw dust. Rubbing with fine sawdust produces a brilliant polish.

Cleaning Windows and Mirrors.

Windows and other glass surfaces may be thoroughly cleaned and highly polished with a compound made by mixing precipitated chalk, 7 oz. and tripoli 2 oz., with a strong soap solution. The latter is made by dissolving castile or an equivalent grade of soap 2 oz., in boiling water 4 oz. After the soap has been dissolved, add the chalk and tripoli and stir until the mixture is smooth. This preparation is applied with a cloth and is allowed to dry, after which the surplus is removed.

Mending Broken Chinaware.

Broken chinaware can be repaired with a cement made by dissolving casein in a saturated solution of borax to form a thin paste. After applying the cement to the broken edges, bind them together and let the article set for a day. Another cement that sets more rapidly is made by grinding casein into a solution of waterglass. These ingredients should be thoroughly worked together by hard

rubbing. The cement should be used immediately.

Testing Eggs for Freshness.

An egg can be tested for freshness by dropping it in a cupful of water in which salt, 2 tablespoonfuls, has been dissolved. If the egg settles to the bottom of the solution, it is four or five days old. If it floats, it probably has been in storage.

Antacid Powders.

Sodium bicarbonate	23 %
Barium sulphate, precipitated	20 %
Magnesium oxide	31 %
Pancreatin	2 %
Diastase	3 %
Lactose	20 %
Oil of peppermint	1 %

Corn Cure.

Salicylic acid	15 %
Lactic acid	3 %
Extract of cannabis	2 %
Acetone	5 %
Flexible collodion	75 %

Dissolve the salicylic acid in the collodion and mix and add the cannabis, lactic acid and acetone.

Permanent Wave Oil.

Borax	4 parts.
Potassium hydroxide	.5 part.
Sodium hydroxide	2 parts.
Sulphonated olive oil	10 "
Strong ammonia	15 "
Water	68.5 "

India's Industrial Progress.

Sheet Metal Working in Lahore.

We understand that it has been decided to open a trade course in die-press sheet metal working at the Government Technical School, Lahore. The term "Sheet metal working" covers the production of a multiplicity of objects in common use and demand. At present, goods made of sheet metal are either imported from abroad or produced by manual labour. Production by manual labour, however is a tedious process. On account of the high costs, manual workers are unable to compete with foreign goods made by press methods, except in the case of goods so large that freight charges raise the price in India to a figure at which it is possible for manual workers to compete.

The method of production employed abroad is that of diepressing in which the metal is cut to shape, shaped, and pierced by the use of steel punches and dies under pressure exercised by hydraulic power, screw or lever presses. This process eliminates a great deal of manual toil and economises material, because under the pressure between the die and the punch, the metal tends to flow to the required shape, thereby reducing the number of parts required to build up a complex object. The actual operation of a press is not a difficult matter. The skilled operations are the preparation of punches, dies, and press tools, and the necessary appliances for making seamed joints, all of which must be accurately designed and perfectly made before the production of goods can begin.

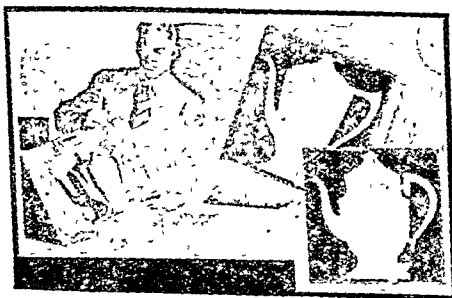
To indicate the possibilities of this trade, the following list of objects made by die-pressing is given:—Sheet metal utensils; tins for canning purposes; cash boxes; oil lamps; instrument cases; japanned tin trays; electric fan blades; exhaust and pressure blower blades; cups; medals; metal buttons; drawing pins; oil cans; electric fittings; sockets, holders and shades; cartridge cases; shell cases; trunks; toilet articles, wash basins and soap boxes; clock and watch parts; and a multiplicity of similar light metal objects too numerous to mention in detail. The process is also applicable to materials other than sheet metal, such as leather packings for pumps and compressed fibre work.

At first, the activities will be limited to making boxes, containers, tin toys and the like, for which there is a demand already, and the production of which provides full training in all the operations concerned in the trade, which are technical drawing and designs; manipulation of sheet metal; pattern making, forge work and fitting on a small scale; making and use of alloys and solders; punch making and fitting; die-sinking and turning; hand chipping and machining of dies of complex form; engraving of fine dies and punches; press work and drop forging; casting in brass, bronze and other alloys; fitting, jointing and assembling by various methods; stove varnishing; stove enamelling and other methods of surface finishing. Theoretical and commercial information will also be provided.

Scientific & Technical Topics.

'Shadow Printing' Speeds up Drafting Work.

To enable draftsmen to obtain true contours of small objects, method of "shadow printing" has been developed. Heretofore it has been difficult for the draftsman to reproduce quickly the true contours of an article such as a percolator for the factory blueprints. By the short-cut method, the model is fastened in an open box having four sides and a bottom.



A piece of sensitized blueprint paper is tacked on the inside bottom boards of the box and the box and model are then exposed to the sun's rays at the proper angle for the time required to obtain a clear print. The great distance of the sun in relation to the nearness of the model to the sensitized paper results in an accurate outline. The sides of the box are necessary to eliminate any lateral reflection. The paper is developed in the usual way and on it are placed the dimensions, designs and decorations. Tracing paper is then placed over the shadow print and the shadow is copied.

Plating on Polished Metals Gives Better Protection.

Better protection of metals against corrosion is claimed for a new method of plating discovered in England. A scientist was watching the arrival on the surface of polished copper of a minute film of zinc crystals which had boiled over to their new location, owing to rapid heating of an electric wire in a vacuum. As a beam of electrons fell on the surface, the scientist saw about twenty bright circles weaken and vanish. He repeated until the twelfth film of zinc crystals stood fast, indicating the liquid layer of polished copper had absorbed all the crystals possible. When the scientist bombarded polished iron with the crystals, the zinc layer stood fast at the second trial. The effect of the discovery is that whereas films on unpolished metals will stand fast at the first attempt and are soon rubbed off, the films on polished metal can never be totally removed and, in some cases, will efficiently guard against rust and corrosion.

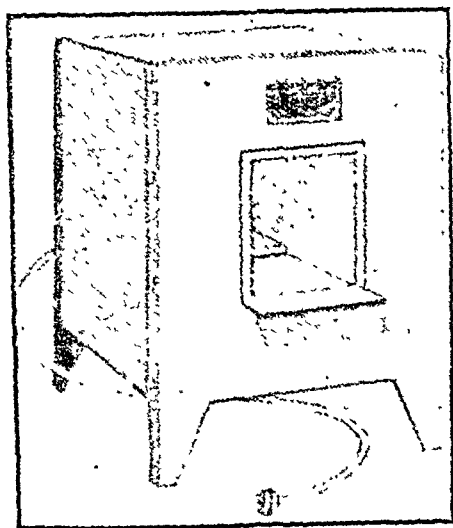
Money-making Errors.

Recently, a workman in a Welsh slate quarry fried his dinner of ham and eggs on a piece of waste slate. The slate expanded with the treatment and was found ultimately to be excellent material for making a new, light concrete. Thus a new industry has been created, giving work to hundreds.

Other mistakes in the past have led to new industries. Blotting paper was invented because a workman in a paper mill forgot to put in the requisite amount of size. The turpentine industry has benefited by more than £200,000 in a few years because a left-handed Negro used a right-handed axe to make a slash in a pine tree. The tree gave a greater yield.

Home Electric Kiln Makes Pottery at Low Cost.

Pottery making in the home or small shop is made practical through the use of a small electric kiln that operates at low cost. Plugged into a standard light socket, it fires up to 2,000 degrees Fahrenheit. The cost for one and one-half hours of baking is about four cents.



The firing chamber is three and one-half inches by three and one-half by four. Before this small kiln was devised, the student had to take his pottery to a commercial kiln for baking.

Isolation of Radio-active Elements.

The successful isolation of protactinium, the parent element in the actinium

series of radio-active changes, was announced last month at the 85th. meeting of the American Chemical Society at Cleveland.

The isolation was achieved at the Research Laboratories of the Universal Oil Produce Company, Chicago, by Dr. Aristid von Grosse, a research associate at the Laboratories, and visiting assistant professor in the department of Chemistry at Chicago University.

It is claimed that protactinium has never previously been isolated in its pure metallic state. Since the first step in the disintegration of protactinium (atomic number 91) is actinium (atomic number 89) the isolation of the one should lead naturally to that of the other.

It is hoped that both protactinium and actinium will prove useful in the treatment of cancer.

Coloured X-Rays.

Mr. Luther G. Simjian, ex-director of the Photographic Department of the Yale School of Medicine, has perfected an apparatus which enables variations of the density of the body structure to be seen not in the usual X-ray shadow tones but in contrasting colours.

The apparatus combines the X-ray fluoroscope and the photo-electric cell of television.

Any of the colours can be intensified at the will of the operator, thus permitting particular organs, to be shown up in sharper relief.

The network of the muscular system, and even the lung tissue are readily discernible.

This invention, which, it is estimated, will cost about £100 to manufacture, makes use of X-rays of far weaker intensity than is customary, and the patient may therefore be subjected to longer periods of observation without harm. The image is capable of being transmitted for a long distance diagnosis.

Formulas, Processes & Answers.

Artificial Flower Fertilizer.

2348 M. K. M., Rangoon—Wishes to have method of preparing fertilizer.

Ammonium nitrate 40 parts.

Ammonium phosphate 20 "

Potassium nitrate 25 "

Ammonium chloride 5 "

Calcium sulphate 6 "

Ferrous sulphate 4 "

Dissolve 1 part in 1000 parts of water and water the flowers with it 2 or 3 times weekly. Dissolve 4 parts in 1000 parts of water, and water with this quantity 10 or 12 pots of medium size.

Essence of Peppermint.

2337 M. M. C.,—Wants processes for preparing essence of peppermint and crystals.

Oil of peppermint 100 millilitres.

Alcohol, 90 per cent,
sufficient to pro-
duce 1000 "

Dissolve. It is not clear, shake it with a little powdered talc and filter.

Peppermint Crystals.

To prepare crystals, put the peppermint oil in a glass vessel surrounded with freezing mixture ice and salt. When the oil has been sufficiently cooled, crystals are deposited at the bottom of the vessel.

Hydraulic Brake Fluid.

2015 N. M. S., Rangoon—Wishes to have a formula for preparing hydraulic brake fluid.

Hydra-acetyl Acetone 40 parts.
Castor oil 60 "
Mix.

Test for Ghee or Butter fat.

2218 R. R. D., Raipur—Desires to learn the process of ghee analysis.

The purity of butter-fat can be ascertained in various ways, most of which are highly technical. But the most valuable and simple test is the behaviour of butter fat with acetic acid; this is known under the name of Valenta's test. The accurate method of carrying out this test is that proposed by Chattaway, Pearmain, and Moor:—

The butter-fat, melted and filtered at as low a temperature as possible, is further dried by filtration through a dried filter-paper. 2.75 grams. of this fat are weighed into a stoppered test tube, and 3 c.c. of 99.5 per cent. acetic acid added. The tube is placed in a beaker of water which is gradually warmed until, on shaking the tube, a clear solution is obtained; the temperature is carefully noted. The following figures represent the temperatures for butter fat and margarine respectively:—

	Max.	Min.	Average.
Butter fat	39.0	29.0	36.0
Margarine	97.0	94.0	95.0

In order to avoid any mistake always test the acetic acid first on a sample or samples of genuine butter fat. Jean prefers to determine the amount of acetic acid dissolved. He weighs about 8 c.c.

of the fat in a graduated test tube 1 cm. in diameter, which is placed in water at 50°C. Then he removes the excess of fat by means of a pipette until the fat measures 3 c.c. at 50°C, and adds 3 c.c. of glacial acetic acid, (sp. gr. 1.0565). The contents are then warmed for a few minutes, and, after inserting a cork in the test tube, well shaken. The tube is then immersed in the water at 50°C., and the amount of undissolved acetic acid determined.

Another important test generally carried on for the determination of the purity of butter fat is the observation of the refractive index by means of Refractometer. For this purpose the fat, kept for some time at 20°C, is spread out on a watch glass, and covered by a piece of filter-paper; the fat is absorbed by the paper, and a clear grease spot forms in the centre. The grease spot is applied to the edge of the Nicol prism to which it readily adheres; the apparatus is closed, and the angle estimated.

The following are the refractive indices of pure butter fat and certain other oils which may enter into the composition of butter substitutes:—

Butter fat at 25°C	1.4587	to	1.4615
—do— 38°C	1.4540	„	1.4569
Coconut oil „ 38°C	1.4500	„	1.4515
Lard „ 38°C	1.4490	„	1.4505
Cotton-seed oil „ 38°C	1.4660	„	1.4680
Suet „ 38°C	1.4605	„	1.4620
Margarine „ 20°C	1.4698	„	

Pearl Ash.

2411 G. N. K., Ujjain—Wants to learn the process of manufacturing pearl ash.

VOL. XXV, No. 298.

Pearl ash or potassium carbonate is prepared by lixiviating wood ashes, and evaporating the solution to dryness. The wood is placed in pits dug in the earth and sheltered from the wind. It is then kindled and burnt off. The ash is collected spread out in thin layers, sprinkled with water, and worked about until evenly damp. The damp ash is then placed in casks provided with perforated double bottoms, which are covered with straw, and washed with water many times. The liquor containing from 20-25 per cent. of salts is then evaporated, and the solid burnt white in a furnace to get rid of organic substances. The crude potash thus obtained, may be refined as follows: Raw potash is dissolved in cold water and the solution allowed to remain for 24 hours in a cool place; it is then filtered, and somewhat concentrated by evaporation, crystallisation being prevented by continually stirring the mass until the whole is nearly cold; it is next decanted into a strainer, and the mother liquor is allowed to drip off; the residuum is evaporated to dryness, at a gentle heat, and redissolved in an equal quantity of cold water; the new solution, after filtration, is again evaporated to dryness.

Marking Inks.

2414 A. S. A., Khamgaon—Desires to know the formulas for preparing marking inks, shampoo, etc.

RED.

Silver nitrate	48 parts.
Tartaric acid	60 „
Gum	40 „
Carmine	2 „
Water	80 „
Ammonia	qs.

Rub the silver nitrate and tartaric acid together in a perfectly dry state and then add the ammonia to them using no more than will give perfect solution with diligent stirring. The clear solution is mixed with gum in solution and diluted, if necessary with water.

BLUE.

Resorcin blue	1 dram.
Distilled water	q. s.
Oxalic acid	10 grains.
Sugar	$\frac{1}{2}$ ounce.

Dissolve the colour in 6 drams of distilled water. Agitate occasionally for 2 hours, then add 24 oz. of hot distilled water and prescribed quantities of oxalic acid and sugar.

Shampoo.

Coconut oil	4 drams.
Ammonia water (10%)	6 "
Spirit of rosemary	$1\frac{1}{2}$ oz.
Eau de Cologne	$1\frac{1}{2}$ oz.
Tincture of saffron.	2 dr.

Mix the oil and ammonia shaking well and then add the other ingredients. To be shaken before use.

Disinfectant Fluid.

Coal-tar distillate (of sp. gr. exceeding 1.09)	100 parts.
Rosin	85 "
Caustic soda lye (30°Be)	60 "
Vegetable oil	20 "

Liquefy the rosin by the application of gentle heat, add the coal-tar distillate, and when thoroughly incorporated and while the mixture is still warm, add the caustic soda, and boil until saponified. Lastly, pour in the vegetable oil (castor oil, olive oil, coconut oil, etc.)

Terting Syrup.

Tincture anethum flor	1 oz.
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Tincture cardamom co.	$\frac{1}{2}$ oz.
Glycerine	$1\frac{1}{2}$ oz.
Syrup	7 oz.
Dose: $\frac{1}{2}$ dram to 1 dram.	

Pomade.

2439 M. J. M., Zanzibar—Wants to know the formula for preparing pomade, brilliantines, etc.

I.

Anhydrous lanoline	2 oz.
Vaseline	11 drams.
Ceresine	75 grains.
Distilled water	1 oz.

Melt the ceresine in the vaseline by the heat of a waterbath, add the lanoline and mix the water intimately with the whole. Perfume.

II

Castor oil	8 oz.
Vaseline	2 oz.
Yellow wax	$1\frac{1}{2}$ oz.

Melt all together, stir constantly as it cools, and when creamy add perfume.

Brilliantines Unseparable.

Castor oil	2 oz.
Rectified spirit	8 oz.
Oil of neroli	5 mins.
Oil of rose-geranium	10 "
Oil of verlema	5 "
Oil of lemon	$\frac{1}{4}$ dram.

Fixatives.

Fixatives are bodies which serve to render more permanent odours of a fugitive nature, such as those of most flowers. They are either bodies of a very persistent odour, or are resins or slightly volatile liquids which hold the more volatile essential oils, either as a kind of varnish, or a viscous solution of low vapour tension, and consequently is

slightly volatile, and so long as the fixative is hot highly odorous which either scarcely modifies the odour, or slightly improves it. There are various types of fixatives: some are of very agreeable odour; others are practically odourless. It is necessary to combine them judiciously in order to obtain the best results. Amongst the good fixatives for hair oil are sandal oil, ambergris, civet, musk, benzoin, perubalsam, coumarin, etc.

Artificial Ottos.

Artificial ottos are prepared mainly from Heiko scents. To prepare otto Bela take Heiko Bela 2 oz. and sandal oil 8 oz. Mix together and keep aside for 15 days. Put in glass stoppered phials.

To prepare other ottos replace Heiko Bela by Heiko Bakul, Heiko Chameli, Heiko Rose, Heiko Jasmine, etc. The proportion of the scent and sandal oil remains the same in all cases.

Coconut Oil Deodorising.

The following process has lately been worked out at the Harcourt Butler Technological Institute, Cawnpore:—

The process consists in boiling for a few hours the coconut oil to be deodorised with a 2 per cent. solution of sodium silicate, removing the soap formed and finally washing and drying the oil. The weight of sodium silicate used for a given quantity of oil depends upon the free fatty acid content of the oil and the alkalinity of the silicate. The quantity of sodium silicate taken is such that its alkalinity is exactly equivalent to the acidity of the oil. Usually with an oil of 3 per cent. acidity, the quantity of sodium silicate of

240° Tw required is 1.6 lbs. per 100 lbs. of the oil.

The oil, taken in a vessel with a tapering bottom and a stopcock, is heated to about 80°C, and its equivalent of 2% silicate solution previously warmed to about 50°C, is poured slowly into it with vigorous stirring. The heating is continued for some time till the liquid comes to boiling. Then as the boiling goes on, water is poured in from time to time to make up the loss by evaporation and this is continued for 2½ hours. By this time the issuing steam is found to have hardly any odour of coconut oil. At this stage, about 5 lbs. of powdered common salt are added, and the whole boiled for a few minutes to coagulate the soap formed. The liquid is then allowed to stand, and the emulsion of soap and silicic acid is carefully drawn off from the bottom. The residual oil is given two or three washings with hot water, till the wash-liquid no longer gives any alkaline reaction. After every washing the wash-water is drawn off from the bottom. The washed oil is then heated in a shallow dish with constant stirring to drive off any residual moisture.

The oil may finally be mixed with 1 per cent. "diatomite earth" (Fuller's earth) and filtered, when the oil is perfectly clear, bright and without any perceptible odour.

Pain Killer.

2442 H. S. K., Lahore—Wants to know processes for preparing pain killer, wrinkle remover, perspiration powder, luminous paint, etc. .

Hydrous woolfat	20 parts.
Vaselin	44 „

Methyl salicylate	10 parts.
Oil of cajuput	2 "
Oil of eucalyptus	2 "
Menthol	2 "

Melt the woolfat and vaselin over a water-bath; then incorporate the other ingredients and put in wide-mouthed bottles. It may be rubbed gently over the affected parts.

Wrinkle Remover.

Distilled extract of	
witch hazel	500 parts.
Boric acid	20 "
Menthol	1 part.
Glycerin	50 parts.
Perfume (with a spirit	
basis)	100 "
Elderflower water	329 "

Dissolve the menthol in the perfume and add to the mixed liquids.

Luminous Paint.

	I.	II.
Strontium carbonate	100	100
Sulphur	100	30
Potassium chloride	0.5	—
Sodium carbonate	—	2
Sodium chloride	0.5	0.5
Magnesium chloride	0.4	0.2

The mixture is heated in a crucible for 45 minutes at about 1300°C.

Perspiration Powder.

Salicylic acid	10 parts.
Bismuth subnitrate	15 "
Zinc oleate	10 "
Mix.	

Hydrogen Peroxide.

In order to obtain a pure aqueous solution of hydrogen peroxide, the pure hydrated barium peroxide is prepared as follows:—

Commercial barium dioxide, very finely powdered, is brought little by little into dilute hydrochloric acid, until the acid is nearly neutralised. The cooled and filtered solution is then treated with baryta-water, in order to precipitate the ferric oxide, manganese oxide, alumina, and silica which are always present. As soon as a white precipitate of the hydrated barium dioxide makes its appearance, the solution is filtered and to the filtrate concentrated baryta-water is added; a crystalline precipitate then falls consisting of hydrated barium dioxide. This is well washed and preserved, in the moist state in stoppered bottles. In order to prepare hydrogen dioxide by means of this substance, the moist precipitate is gradually added to a cold mixture of not less than five parts of water to one part of concentrated sulphuric acid, until the mixture remains very slightly acid. The precipitate of barium sulphate is allowed to settle, and the liquid filtered. The small trace of sulphuric acid which the filtrate contains can be precipitated by careful addition of dilute baryta solution.

Mounting Photo on Glass.

I.

Clean the glass thoroughly. Pour on gelatine dissolved in boiling water, lay the picture on and pour on gelatine again until everything swells; neatly remove what is superfluous, avoiding blisters, and allow to dry.

II.

	Parts by weight.
Gelatine	16
Glycerin	1
Water	32
Methylated spirit	12

Prepare the mixture by swelling the gelatine in water; dissolve it by moderate heat; add the glycerin and stir thoroughly and pour the whole in a thin stream into the alcohol.

Red Paint.

2540 T. N., Bhimavaram—Desires to know the recipes for preparing red and white paint.

Red lead (dry)	25 lbs.
Linseed oil (raw)	1 gallon.

Mix thoroughly and strain. To hasten the drying add a gill of good japan driers.

White Paint.

White lead in oil	7 lbs.
Zinc white in oil	7 lbs.
Linseed oil (raw)	1 quart.
Turpentine	1 quart.
Japan driers	1 gill.

This paint dries with an egg-shell gloss.

Concentrated Dill Water.

2551 S. A., Ghatkopar—Wishes to have a formula for preparing concentrated dill water.

Oil of Dill	20 Millilitres.
Alcohol (90 per cent.)	600 „

Distilled water, sufficient to produce 1000 millilitres.

Dissolve the oil of dill in the alcohol and add sufficient distilled water in successive small quantities to produce the required volume, shaking vigorously after each addition. Add 50 grammes of powdered talc, and shake; set aside for a few hours, occasionally shaking; filter.

Typewriter Ribbon Inks.

Alcohol	2 oz.
Aniline colour	$\frac{1}{2}$ oz.
Water	2 oz.
Glycerin	4 oz.

Dissolve the aniline in the alcohol and add the water and glycerine. By taking aniline red, crimson shade can be imparted to the ink.

Zinc Oxide.

2419 B. F. C., Jalalpur Kiknan—Wishes to know the process of manufacturing zinc oxide.

Zinc oxide is prepared on a large scale by distilling zinc into chambers in which it meets a current of air; the metal burns and deposits flakes of the oxide. This is treated with water, when the metallic zinc present sinks readily to the bottom, and is so separated. A couple of recipes follow:—

1. Sulphate of zinc (pure), 1 lb; carbonate of ammonium, $6\frac{1}{2}$ oz.; dissolve each separately in 6 quarts of water, filter, mix the solutions, well wash the precipitate with water, and calcine it for two hours in a strong fire.

11. Place carbonate of zinc in a covered clay crucible, and expose it to a very low red heat, until a portion taken from the centre of the mass ceases to effervesce by being dropped into dilute sulphuric acid.

China Clay.

China clay is found in granite soils rich in felspar and contains a small amount of mica and porphyry. The impure clay is washed to separate the coarsest and heaviest particles of clay, which settle rapidly from the finer and lighter ones, which remain longer in

suspension in water. Only the coarsest impurities are removed, while those which are frequently in the form of fine powder, such as sand, carbonate of lime, and oxides of iron, remain at least partially incorporated with the true clay. The methods of washing china clay include three stages, namely blunging or mixing the clay with water, separation of the grit and sand, and placing the clay in settling tanks.

Separation of Gold, Copper and Zinc.

2423 K. I. S., Imphal—Wants a process of separating gold, copper and zinc.

To separate gold, copper and zinc, first beat the alloy into thin sheet and cut into small pieces. Then treat them with strong nitric acid in a porcelain or enamelled tray. By this both copper and zinc are dissolved out leaving pure gold unaffected. Now evaporate the solution to dryness over slow fire and dissolve the residue with small quantity of water. After this pour a few drams of pure sulphuric acid to convert the copper and zinc into respective sulphates. Then pass sulphuretted hydrogen gas through the solution whereby the copper is precipitated in the form of copper sulphide and is separated by filtration. The precipitate is washed and dried and then transferred to a crucible covered with charcoal, which is next heated so that the sulphide is reduced to metallic copper. The solution obtained from the separation of copper is finally electrolysed to get zinc.

Extraction of Lead.

2486 J. C. C., Thaton—Wishes to learn a process of extracting lead.

Lead is extracted from galena by heating it in a reverberatory furnace, after mixing with about a twentieth of its weight of lime. The ore is first heated somewhat gently in a strong current of air drawn through the furnace; by this means it is partly converted into the oxide and sulphate. This action having proceeded sufficiently far, the mass is raised in temperature, when the sulphide and sulphate with oxide mutually reduce each other, with the formation of metallic lead. This is removed from the furnace, and any siliceous gangue associated with the ore forms a slag with the lime.

Sulpho-Indigotic Acid.

2479 V. V. S. R. N., Masulipatam—Desires to know a process of making neutral sulpho-indigotic acid.

The indigo is powdered finely and dried at a temperature lower than 120°C. It is put in a spacious earthen basin and fuming sulphuric acid is poured cautiously with constant stirring while it is still warm. Acid four times the weight of dried indigo being added, the basin is left covered up for 24 hours. Sulpho-indigotic acid is hereby formed. The liquid is then diluted to 10 or 12 times its old volume and is allowed to stand for a few days. Insoluble matters settle below and the clear solution decanted off. It is then treated with potassium carbonate. Carbon dioxide escapes due to the presence of acid in the solution. When no more carbon dioxide evolves, which is indicated by the ceasing of the effervescence, the solution is concentrated and preserved in bottles. The carmine thus formed is deep blue and extremely solu-

ble in water but almost insoluble in alcohol or in saline solutions.

Enamelling Sign Plates.

2618 J. P. B., Tiruvannamalai—Desires to learn the process of enamelling sign plates.

All enamelled wares received first a coat of grey enamel—the fundamental coat, since on this has to be placed the future colours—consisting chiefly of a coating of glass. This operation is followed by a coating of white or glazing the additional colour being afterwards laid on the white. Singboard plates, after being levelled or set flat, are bevelled, and dipped into a bath of hydrochloric acid composed of equal parts of acid and water. They are next heated to redness to loosen the scale, and cleared in dilute sulphuric acid; then rinsed in cold water, well scoured with fine sand, again rinsed, but in boiling water, and afterwards dried. The enamel mixings are applied either in the form of a powder or as a liquid paste, the latter for preference. The liquid paste is poured over the plate, or the plate is dipped into the liquid, any surplus being drained off and any portion not to be coated being cleared with a cloth. The first or grey coat is dried at 160°C and is afterwards fused at a cherry red to a white heat about 1200°C, this being done in a muffle furnace. This first coat becomes impressed or fused into the body of the metal, thus obviating cracking or peeling off. It is allowed to cool slowly and uniformly. The next coat of white is then applied. It must be made as liquid as possible, and fused at a lower temperature, about 1050°C so as not to interfere with the first grey coating. The coloured coatings are similarly applied. The mixings are thoroughly ground up, well mixed, fused in a suit-

able crucible, and run into cold water to render them brittle and easy to grind. After fusing, they are reground very fine. The grinding mill is of a special character, so constructed that any particles of iron are prevented from coming into contact with the material being ground, as the iron would cause distinct discoloration. The grey mixing should be kept in a condition just liquid enough to pour, a suitable quantity of water being added only when the mixing is required for work. The white is mixed and kept in covered tubes till used. The mixings must be well protected from dust. The main points to be carefully followed are: Thoroughly clean the plates before use. Fuse the grey at such a heat that it may only coat the plate, but eat its way into the surface of the metal; this is only done at a white heat, and at a higher temperature than the white, so that it may not be altered when applying the white. The compositions have the same capacities for expansion and contraction as the metals upon which they are applied; but a most important point is slow and uniform cooling. The composition of the various glazes is as follows: The grey ground No. 1: Any kind of glass 49 parts, oxide of lead 47 parts, fused borax 4 parts. No 2. Quartz, 67½; borax 29½; enamelling soda 3; No. 3. Silica, 65; borax 14; oxide of lead 4; clay, 15; magnesia 2. No. 4. Any kind of glass 61; red-lead, 22; borax, 16; nitre, 1. The white ground—No. 1. Felspar, 33; borax 22½; quartz, 16½; oxide of tin, 15; soda 8; fluorspar, 3¾; saltpetre, 2¼. No. 2. Cullet, 20; lead 52; arsenic, 4½; powdered flint, 15; soda, 4½; nitre 4. No. 3. Silica powder, 30; borax 17; oxide of tin, 18; soda, 8½; nitre, 7½; white-lead, 5½ ammonium carbonate, 5½; magnesia, 4; silica powder, 4. For the various shades or

colours, the following are used: Blue-silicate of cobalt or smalt. Violet-peroxide of manganese. Green-oxide of copper, with if necessary, a little oxide of iron. Naples yellow or orange—red oxide of iron and an antimony preparation mixed to give the desired tint. Red-sulphate of iron and alumina. Brown, black and purple—oxide of iron mixed with a certain proportion of clay. Black-oxides of cobalt, iron and manganese.

Permanent Ink.

2491 M. Z. A., Allahabad—Wants a recipe for making permanent ink for documents.

Mix 1 part of honey, 14 of water, 2 of sulphuric acid, and enough indigo, dissolved in fuming sulphuric acid, that the fluid seems to be sufficiently coloured to furnish legible writing on paper. The writing executed with this ink, which, of course, must not be done with a steel pen, becomes perfectly black by heating the paper. To prevent the writing from being destroyed by free acids, it is, after the paper has been heated, moistened with spirit of sal-ammoniac, or the document is placed in a box and there subjected to vapours of carbonate of ammonia. It is claimed that this ink answers all demands.

Insect Sprays.

2634 M. J. M., Zanzibar—Wants recipe for preparing insect and fly sprays.

Oil of pennyroyal	2 oz.
Oil of sassafras	2 oz.
Alcohol	4 oz.

Mix well together and put into bottles for use. To drive off mosquitoes shake the bottle and spray around with a sprayer.

Fly Sprays.

Insect powder	8 oz.
Paraffin oil	1 gallon.
Eucalyptus oil	1 oz.

Methyl salicylate, sufficient quantity.

Macerate the insect powder in the paraffin oil for 48 hours, strain and add the other ingredients. A small amount of this preparation when sprayed will not only kill flies but also other insects.

Disinfectant Fluid.

2657 K. A. N. A. M., Ootacamund—Wants a formula for preparing disinfectant fluid.

Rosin	3 Cwt.
Creosote	200 gallons.
Caustic soda 35°B	30 gallons.
Water	80 gallons.

Put the rosin and water in a suitable vessel and heat together until all the rosin is melted, then add the creosote and soda lye, crutch well for 15 minutes, and let it cool.

Hair Tonic.

2673 G. K. K., Jaipur—Wishes to have a recipe for preparing hair tonic.

Castor oil	10 dr.
Balsam of Peru	3 dr.
Jamaica rum	12½ oz.
Distilled water	6 oz.
Tinct. of cinchona	1½ oz.
Cologne water	1½ oz.

Mix and keep in well stoppered bottles for use.

Caustic.

Caustic is the abbreviated name of lunar caustic: It is actually the solution of silver nitrate.

Black Leather Varnish.

3032 G. R., Yerraguntla—Desires to know recipes for preparing black and brown leather varnish.

Shellac	100 parts.
Pine rosin	20 "
Venice turpentine	50 "
Oil of turpentine	40 "
Methylated spirit	1,000 "
Lamp black	40 "

When applied to belts, this varnish, which is fairly elastic, soon forms a fine uniform coating, which dries rapidly, and does not easily crack, even when the leather is strongly bent. For this reason it is very useful for boot leather.

Brown Leather Varnish.

Powdered garnet	
shellac	112 lbs.
Turpentine oil	21 lbs.
Bismark brown	1 lb.
Methylated spirit	30 gallons.

READER'S BUSINESS PROBLEMS

[Reader's business problems will be discussed in these pages. We invite the reader to write us his difficulties. As the department is in charge of an experienced businessman who is specially adept in dealing with such problems and to whom experiences of a large number of successful business men are available, his replies will lead the enquirer to a successful career. These replies will be published in the paper only and cannot be communicated by post.]

Starting A Small Shop.

2785 H. R. H., Bombay—Writes, I am a healthy young man with good physique. I intend to start a small stationery shop but I get nervous seeing the failures of so many small shops. If you supply me with your personal advice I can start my business career.

Really it is very difficult for a businessman with small capital to carry on his business in the face of keen competition. Select your shop in a place which is not far off from the wholesale market so that you may stock all kinds of articles in minimum number and replenish your stock at ease when necessary. But never let your customers know that your stock is meagre and you supply their requirements from the nearest wholesale market.

When you have once established your business try to make the doorway of your shop attractive. Make a personal friend of every one who comes in. As you have very little capital you must set out to get a lot of goodwill. You may have the smallest shop in the street, but if it is the friendliest, it will not put up its shutters. The less capital a man has, the more he must have goodwill. So you must sell a good product or give a useful service. It is possible to begin on the lowest rung of the ladder of business and to climb to the top. Nothing venture, nothing have.

Starting a Dairy Farm.

2508-R. C. P., Calcutta—Enquires if the business of dairy farming be a profitable business.

Yes, cow-keeping, if carried out properly can be made paying and profitable. The daily cost of feeding and keeping a cow should not ordinarily exceed three-fourths the price of the milk she gives.

If a cow gives 6 seers of milk per day, and the price of milk be 4 annas a seer, her food and keep should not ordinarily cost more than 12 annas per day. It is profitable to keep large cows yielding much more milk for business purpose. A large cow properly fed and giving 12 seers of milk should never cost more than one rupee and annas eight a day for her food and keep. But you get Rs. 3/- per day selling the milk four seers per day. Thus you get 100 p.c. profit.

Besides the profit from the milk, there is the calf. If the calf be of a good breed, and proportionately developed at ten months of age it will sell for from fifteen to twentyfive rupees. Then again there is the dung. Some people make a great deal of profit from this article. The dung should be gathered every day, and preserved for either manure or fuel. It should be made into cakes or rolls, and dried and sold as fuel, or else a pit should be dug, and the dung and urine collected into it every day. Cow dung and urine make splendid manure. The dung of one cow should fetch from eight annas to one rupee a month. There is money even in the hide, horns, and bones of the cow when she dies.

A cow purchased is, if well managed, so much capital; a calf born is so much increase on your capital, and the cost of the mothers feed and keep is more than balanced by the milk and butter she supplies.

To ensure success in dairy farming it is of the utmost importance that the best milking breeds be selected. Some people are penny wise and pound foolish, and will buy cows of no stable breed whatever and of very inferior milking qualities, rather than pay a decent price for a good and pedigreed one. An ordinary cow can be bought for a few rupees,

but she will give little or no milk, and her feed and keep will cost more than her milk is worth. Besides, her calf will sell for hardly anything. This is a great loss in business. It is always more profitable to keep a good cow that will give the required amount of milk than to keep three or four inferior ones that will in the aggregate give that quantity. Four inferior cows will cost more to feed and keep than one or two good ones will. Some of the best breeds of cattle in India are Montgomery, Sind, Hansi or Hissar, Nagaur, Nellore or Ongole, Gir, Kankreji, Mooltan and Amritsar cows, etc.

Improving A Business.

2938 P. K. R., Madras—I have a steel trunk business at Madras and I am suffering from the present trade depression. What shall I do to improve my business?

There are two ways of improving your dwindling business: one by spending more money on it, and the other reducing your overhead charges. If you feel that you are in a position, without jeopardising your solvency, to shift your business to a better situation (which would require you to pay higher rates of rent) and to spend greater sums of money in advertisement you might try that experiment. But before doing that you must satisfy yourself to the best of your ability that you will be able to increase your profits by this increased expenditure, if you apply yourself to the business with renewed zeal and vigour. Your own personal experience in this respect would enable you to answer this question. Advertisements judiciously given, and the distribution of handbills, all written in telling style almost always help the business man in recovering lost ground. You may also engage some brokers on payment of just a little more than their usual rates of commission, to secure customers for you.

If, on the other hand, your pecuniary circumstances do not warrant you to increase your expenses, or if you think that to be too risky a step, we are afraid, the only course left open to you is to reduce your establishment charges by curtailing the number of your assistants

should you have any, and by yourself personally attending to all the needs and requirements of your customers. You might, none the less, engage brokers on increased commission and keep on distributing hand bills, which will not cost you much. If you can secure the services of some canvassers who will agree to work for you on a commission basis, so much the better. You may certainly devote greater care and attention to exhibiting your goods effectively by attractive window display and for this purpose you should study the methods adopted by your more skilful rivals in the market. You need attract more customers and all your endeavour should be turned to that.

Mail Order Advertisement.

2332 L. C. A., Calcutta—I have started a mail order business very recently but I am at a loss as I cannot write an advertisement so that enquiries may come in number.

Yes, we understand your difficulty and shall try to solve it as far as we can. Writing mail order advertising is an art in itself. It must be a "puller" in small space, for mail order advertising is usually done in small space, and if properly phrased and constructed gets as many enquiries as can be elicited through large space, in which respect it differs radically from the so-called general publicity advertising. Every line counts in a mail order advertisement, hence the sentences must be clear and terse. Certain redundancies and waste of space may be permissible in general publicity, but in mail order advertising every word must be pregnant with vital interest, as the object is to possess the reader's mind with new want or to move him with the idea that an old want may be quickly and cheaply gratified. The sentences must have individuality of style and must be different enough from the general run of advertisements to command immediate attention and interest. The headline or caption of the advertisement should tell what the article is, and much will depend upon the wording of this headline or introductory sentence in the matter of its ability to attract the attention of readers.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of Industry are invited. Enquiries or replies from our experts will be published free of charge. Questions are replied by post on receipt of As. 4 stamps of small value only for each question. In order to facilitate the work of Editor's Department and to help prompt action the readers are requested to send enquiries in separate letters.]

2765 L. L. M. G. C., Simla—The following are disinfecting fluid (phenyle) manufacturers of India:—B. N. Chatterjee & Co., 26, 28th. St. Rangoon; Bhubaneswar Chemical Works, 10, Prannath Pandit St., Calcutta; John Paterson & Co. (India) Ltd., Foreshore Road, Shibpur, Howrah; Michael Martin & Co., The Mall, Lahore; S. P. Khanna & Co., 1698, Peeppal Mahadeo St., Delhi etc. Match manufacturers:—Bhagirathi Match Factory, 1, Jogen Bysack Road, Baranagore, Calcutta; Dharamsey & Co.'s Match Factory, 19, Dum Dum Road, Calcutta; Esavi Match Mfg. Co., 46-47-1-1, Muraripukur Road, Manicktala, Calcutta; Maha Laxmi Match Factory, Shahdara, Lahore. For detailed list please see Industry Year Book & Directory.

2769 Y. A. T., Surat—You are to go through a book on cotton cultivation and therefore write to Thacker Spink & Co Ltd, 3, Esplanade East, Calcutta.

2770 S. V., Bolārum—The apparatus etc., intended for telegraph coaching class may be supplied by Chicago Telephone & Radio Co., 175, Hornby Road, Fort, Bombay.

2771 L. Y., Insein—(1) Flowers cannot be preserved for such a length of time. They may however be kept for 2 or 3 days by dipping the stems in weak brine. (2) A formula resembling Flit is as follows:—Oil of pennyroyal 8 oz., oil of sassafras 7 oz., Rectified spirit 16 oz. Mix. (3) Not known. (4) Not known. (5) The formulas of boot polish and lice killer appeared in September 1933 and April 1933, issues of Industry respectively. (7) Mosquito toilet powder:—Eucalyptus oil 3, Talc 6, Starch 42. Mix and keep in corked bottle. (8) Bug destroyer:—

Oil Eucalyptus 1 dr., Eucalyptus leaves 1 oz., Benzene 2 oz., Turpentine oil 2 oz., Kerosene oil to 16 oz. Mix the turpentine benzene and kerosene oil and macerate the eucalyptus leaves in it for 24 hours then strain and make up the measure to 16 oz. having first added the oil of Eucalyptus.

2772 K. M. M., Madras—(1) For manufacturing cigars a capital of 2 or 3 hundred rupees will do. (2) No machinery is required. (3) It may be lucrative provided your production is not bad in quality nor higher than market price. (4) Yes. (5) For process and other particulars you are advised to read our book entitled Indian Tobacco and Its Preparations.

2774 K. I., Kallianpur—Please let us know the composition of your ink particularly whether you have used any hygroscopic substance such as sugar. Scarlet red is not hygroscopic hence the deliquescence is probably not due to the colour. You may pack the ink in grease paper.

2776 E. A. K., Mombasa—(1) To prevent lozenges from absorbing moisture dust them with starch. (2) Punch them while yet hot. (3) The process of manufacturing all varieties of lozenges has been fully described in Profitable Industries published from this Office. (4) Add a pinch of cream of tartar to the boiling sugar to effect transparency. (5) Pottery (including porcelain making etc.), will be found in our Manufacturing Industries. Please go through the book. Vegetable ghee (hydrogenated fats and oils) and Glucose making appeared in May 1933 and October 1933, issues of Industry.

2777 B. P. C., Cawnpore—Levigated Kieselsguhr etc., may be supplied by Calcutta Mineral Supply Co., 31, Jackson Lane, Calcutta.

Machinery for the Manufacture of

Chemicals, Powder, Hair Oils, Creams, Perfumes, Pills, Tablets, Drugs, Medicines, Artificial Ghee, etc. Also:—

Chemical Plant, Oil Mills, Filter Presses, Sugar Mills & Centrifugals, Tin Box Making Machinery, Sterilisers, Laboratory Apparatus, Biscuit and Bread Making Machinery, Laundry Machinery, Tube-filling Machinery, Winnowing Machinery, Threshing Machinery, Fruit Preserving Machinery, Water Softening Plant, Slate and Stone Working Machinery and Pumps for all purposes.

W. J. ALCOCK & CO., 7, Hastings Street, Calcutta. Saroop & Bansilal, 57, The Mall, Lahore. Agent for Bareilly District KODESIA ENGINEERING CO., Naini Tal Road, Bareilly.

2778 L. Z., Twante—Gardening and Poultry farming that you have chosen are undoubtedly profitable. For guidance, you have already got books. You may read the following book as well:—A. B. C. of Garden Management by Ward Lock; price 2s. 6d.; Poultry Keeping on the Farm by Brown; price 2s. The Truth about Poultry by Scott; price 5s. The A. B. C. of Profitable Pig Breeding by Butcher; price 1s. 6d.; all to be had of Messrs. Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

2780 C. K. S. P., Trivandrum—Producing black discoloration of silver plated articles, erroneously termed oxidising is performed by various methods one of them is as follows:—4 or 5 grains of potassium sulphide (Liver of Sulphur) are dissolved in an oz. of hot water and the solution applied with a brush, or the article wholly immersed if desired. The temperature of the solution should be about 150°F. After a few moments the silver surface assumes a darkened appearance, which deepens in tone to a bluish black by longer treatment. When the desired effect is produced the article is rinsed and then scratch-brushed, or burnished if required or the blackened hollow surfaces are left dead according to taste. When it is desired to produce a dead surface upon an article which has been electro-silvered, the article may be placed in a copper sulphate bath for a short time, to receive a slight coating of copper, after which it is again coated with a thin film of silver in an ordinary cyanide bath. It has then the dead-white appearance of frosted silver. Where portions of the article are afterwards oxidised a very fine contrast of colour is produced. In using the sulphide of potassium it should be applied soon after being mixed, since it loses its activeness by keeping. Fresh solutions al-

ways give the most brilliant results. Since the sulphide dissolves the silver, it is necessary that it should be applied only to surfaces which have received a tolerably stout coating of this metal, otherwise the subjacent metal (brass, copper, or German silver) will be exposed after the sulphide solution has been applied.

2781 M. V., Burmajra—For a toilet soap factory to produce high class soap i.e., milled toilet soap, 3, indispensable machines will cost nearly 4 thousand rupees in addition to other requisite implements and the complete factory equipment will range from 6-7 thousand rupees. Hence at least 10 thousand rupees is necessary to work the factory on. For cold process toilet soaps Rs. 5,000 will do to conduct the factory fairly well. The chemicals may be supplied by Imperial Chemical Industries, 18, Strand Road, Calcutta; Oils by Khimjee Hansraj, 165, Lower Chittpore Road, Calcutta; Colours by Fuzle; Hussain, 44, Armenian Street, Calcutta; Perfumes by Paradise Perfumery House, 75, Colootola Street; Tallow by Ghashi Mia No. 1, Narkeldanga Road; Kasai Mahalla, Calcutta; Machinery by Oriental Machinery Supplying Agency, 20, Lal Bazar Street, Calcutta. Boxes by Delhi Card Board Box Factory, Delhi. The best book on Soap for a layman is Manufacture of Soap price 1/8/- only, published from this Office.

2782 L. N. R., Fatehpur—In order to secure agency you are to advertise in wide-read papers and also watch the requirements of such firms in wanted columns.

2785 V. B. D., Pachhar—Wants to be put in touch with English and American firms dealing in money lending and house mortgaging business.

2791 N. R. S., Berhampur—Moulds for soap manufacture may be had of Oriental Machinery Supplying Agency, 20, Lal Bazar Street, Jagabandhu Dutta, Nimu Goswami Lane; Oil paper may be had of Purna Chandra Kundu, Old China Bazar Street, all of Calcutta. Cardboard Boxes may be had of L. B. Varma & Co., Juhu, Cawnpore.

2793 E. C. W., Kohat City—The recipe of Amla oil appeared in June 1933, issue of Industry and also may be found in full delineation with many other preparation in our "Indian Perfumes, Essences & Hair Oils" price 1/8/- only. In refining Til Oil the easiest method is—heat the oil to about 105°F. and spread over it kaolin or Fuller's Earth and after stirring briskly for 10 or 15 minutes let the oil settle, the earth will subside with impurities leaving the clear oil above.

2794 G. B., Sandur—Yellow and red ochres of good quality are found in the Katni district.

S. H. Kelkar & Co.



36, Mangaldas Road,
Bombay No. 2.
Wholesale Importers and
Stockists of

Essential Oils, Aromatic
Chemicals, Synthetic Per-
fumes, Flower Oils, Soap
Perfumes, Oil colours and
all sorts of Perfumery Raw
Materials required for Per-
fumes Soap Makers, Agar-
bathi Manufacturers, etc.,
etc.

Prices and other Particulars
on Application.

Inferior ochres and certain kinds of red oxide occur in various parts of India. The Indian red oxides that have so far been found are, although quite good in other respects, of poor colour and therefore of limited usefulness. The best natural red oxide comes from the Persian Gulf and is imported in its crude state into India. These are pigments and are used as paints and also in pottery for brightening the colour of the articles.

2798 N. R., Chervu—The following are virginian tobacco purchasers:—Michael & Co., The Mall, Lahore; Associated Tobacco Blenders of India, 87, Market Road, Karachi; Home Cigarette Factory, Rambagh Garri Hatta, Karachi; Indian National Tobacco Co. Ltd., Lawrence Road, Karachi; Indian Swadeshi Cigarettes Tobacco Co., Chandni Chowk, Delhi.

2799 J. S. F., Moulmein—Precious stone and synthetic diamond merchants:—Tarachand Pursram, A-19, Sir Stuart Hogg Market Calcutta; Artificial Diamond & Co., 97, Mint Street, Sowcarpet, Madras; Balakrishna Mehta & Sons, 453, Mint Street, Park Town, Madras; Maximilian Leyser, Leipzig Cl, Kapellenstr. 5 Germany; Karl Kohn & Co., Gablonz a/N (C. S. R.) Reichenberger Strasse 17, Germany; Gebr. Herringer Idar-Oberstein, 2, Hauptstr. 34, Germany. Golay-Buchel, Sentier, Switzerland.

2800 B. V. N., Gwalior—To prepare snuff no machine in the proper sense is required. For big production a grinding machine will suffice. Grinding machine may be supplied by Oriental Machinery Supplying Agency, 20, Lall Bazar Street, Calcutta. I would advise you in this connection to read our book "Indian Tobacco and Its Preparations" that will enlighten you in this matter towards producing the best kind of snuff you want. It also contains excellent formulas.

2802 A. C., Secunderabad—Imitation jewelry may be supplied by Gebr. Herringer, Idar-Oberstein p, Hauptstrasse, 34, Germany 'and Ikegami & Co., 1336, Tanmonochō, Naniwa-Ku, Osaka, Japan

2803 A. G. H., Dibrugarh—(1) It is not possible to buy a sewing machine at so cheap rate. (2) For making banana food selected green bananas are plunged into water at 80°C to

facilitate peeling and, after remaining in the water from four or five minutes are removed peeled and introduced into a vacuum drier. They are stirred while drying for about two hours. The mass is then passed through sieves with 120 meshes to the square inch. If an enterprising young man having banana plantation would try, he can make the industry a commercially profitable one.

2804 S. G. I. S., Indore—(1) For a copy of Government Report, write to Madras Secretariat Book Depot, Madras.

2806 M. A. T. S., Sialkot—(1) If you heat waste glass it will form a paste which requires further manipulation to be made into different articles. (2) Process of melting rubber will be found in December 1934 issue. (3) By the application of heat ebonite also softens and resembles paste.

2809 H. W. C., Colombo—Process of preparing French polish, rose water, etc., will appear in an early issue of Industry.

2810 I. S., Aldona—We are not aware of the German firm seeking agents.

2813 K. M. R., Coimbatore—(1) Sewing machine is manufactured by Eastern Sewing Machines Ltd., 25, Pollock Street, Calcutta and Eastern Engineering Co., 62, Bow Bazar Street, Calcutta. (2) Sewing thread may be had of Bharat Trading Co., 22, Sukea Lane, Calcutta.

2819 S. A., Ghatkopar—(1) Hindi equivalent of gulancha is gulancha and Gujrati equivalent is Gado. (2) Hindi equivalent of chiretta is Nilkant and Gujrati equivalent is Kadu Chirayata. (3) Gujrati equivalent of bakash is Adurasper and Adulso. (4) Hindi equivalent of Khetpapa is Daman-paper. (5) Hindi equivalent of myrobalan is Pilehar, Harda and Gujrati equivalent is Himaja; Pilo-harde and kabuli Harda. (6) Hindi equivalent of Picrorrhiza is not available. This is known as Katuki and Katuka-rohini. (7) Other formulas you require will appear in an early issue of Industry.

2822 R. A. P., Sirsi—You may manufacture disinfecting fluid with Rs 6000. In this connection you may consult Manufacture of Disinfect-



A PURELY INDIAN CONCERN

Unprecedented in its nature. Devoters of Indian labour and capital to the faithful Recording of inimitable voices of well known

singers, by New Electric Process. Manufacturers of "Hindusthan" Records, Gramophones and other accessories. Catalogues on request.

HINDUSTHAN MUSICAL PRODUCTS & VARIETIES SYNDICATE LTD.,

6/1, Akkur Dutt Lane, Calcutta.

and Nanak Singh Dayal Singh, Rawalpindi City, (4) Soap machines may be had of Industrial Machinery Co., 14, Clive Street, Calcutta. (5) It will be profitable for you to buy cutlery from Bombay market.

2853 K. M. M. A. K. R., Koduvayur—Picture post cards may be had of Scientific Publishing Co., Bhawanipore and Calcutta Commercial Bureau, Kalghat, both of Calcutta

2856 A. M. R., Bangalore City—(1) Kalmistambul is an indigenous perfume. (2) This settles as dregs in the rosewater industry. (3) They are mainly used in perfumery and tobacco (4) Gynocardic acid may be had of B. K. Paul & Co., 1 & 3, Bonfields Lane, Calcutta. (5) Chickory is imported mostly by coffee manufacturers. Wants to be put in touch with dealers in chicory powder. (6) Rectified spirit is the same as spirit of wine. (7) It is not possible to remove the odour of liquor ammonia.

2858 O. P. M., Ajmer—For tin can making machines you may write to Taylor & Challen Ltd., Birmingham, England.

2859 A. M. V., Kottayam—You should use machine for packing air-tight. For machine you may enquire of W. J. Alcock & Co., 7, Hastings Street, Calcutta.

2860 J. R. G., Ahmednagar—You may consult Shoe Manufacturers' Monthly published by Halford Publishing Co. Ltd., Spencer Chambers, 4, Market Place, Leicester.

2864 M. J. R., Ellore—(1) Japanese goods and toys may be had of Indo Japanese Commercial Museum, 135, Canning St., Calcutta.

2867 B. N. S., Bombay—Process of making squash will appear in an early issue of Industry.

2869 S. S. R., Cuddapah—Address of the gentleman is not known.

2872 C. A. C., Ahmedabad—For blocks you may write to N. D. & Co., 150, Manicktata Street, Calcutta and C. H. Aran & Co., 235/1, Bow Bazar Street, Calcutta.

2874 S. C. C., Benares City—Process of making paint and varnish will appear in an early issue of Industry.

2875 P. N. J., Nairobi—(1) For glassware making machines write to Schiller-Glasmaschinen-Industrie G.m.b.H., 13/14, Nollendorf Str., Berlin W 30. (2) For lantern making machine you may write to Wanderer-werke A-G, Schönan-Chemnitz, Germany and Ulbricht, Hermann, Chemnitz, Germany.

2876 G. C., Wazirabad—To rectify the defect of cement manufactured by you use clay rich in silica. Silica is kankar.

2878 T. V. R., Gollapalem—Process of dyeing and printing silk will be found in October, 1934, issue of Industry.

2881 S. L., Amritsar—You better consult a mechanical engineer.

2882 M. A. A., Bombay—(1) Following is a process of refining castor oil: Castor oil 20 parts; bichromate of potash 2 parts; sulphuric acid 3 parts. Dissolve the bichromate with hot water, add the acid, then slowly put this mixture into the oil, agitating with hot air or a rouser made of lead. Draw off the chemicals, add $\frac{1}{2}$ p.c. oxalic acid with boiling water, agitate all the time till oil becomes clear, bright and odourless. If the oil is intended for medicinal purpose it should not be purified in the above manner. You may do it by passing steam into the oil for some time so that the odoriferous matter may escape. (2) To purify methylated spirit put some quicklime in methylated spirit. Keep it undisturbed for 24 hours. Filter and you will get refined methylated spirit. (3) Fancy goods and novelties may be supplied by Hishihira & Co. Ltd., Utsu-bokitodori 1-Chome Nishiku, Osaka, Japan and Naniya Bayeki Shokai, 25, Satsurabari Minaminochi Nishi-ku, Osaka, Japan. (4) For secondhand newspapers you may enquire of Alexander Jacob & Co., Eagle Wharf, Hill Street, Peckham, London S.E.15.

2886 P. C. A., Jaipur—(1) No other recipe for removing small 'pox' mark is known. (2) Hindi equivalent of winter green is "gandhapuro," that of thyme is "ipar" and that of cumin is "Safed Jeera."

2887 A. C. W., Kolhapur City—November, 1934, issue contains a recipe of antifilthogenic paste.

2889 M. C., Bahraich—Printed tin cans may be had of Metal Decorating & Shaping Co. Ltd., 112, Narkeldanga Main Road, Calcutta.

2891 H. L. B., Poona—A formula of bar soap will appear in an early issue of Industry.

2893 I. B. C. C., Colombo—Following is the process of making coconut butter: Cut into thin slices the dried copra and extract the fat by means of an oil press. This oil contains free acids as well as bad odours. To remove the



SAPAT LOTION

MEANS

A Radical cure for ringworm and all sorts of skin diseases. Price As. 6 per bottle, postage extra.

AGENTS WANTED EVERYWHERE.

SAPAT & CO., (I),
Bombay 2.

acids, place the oil in a tank and put into it powdered chalk, which absorbs fatty acid. Now allow the chalk to settle down then filter or decant off the clear oil. Repeat the process four or five times to remove the last traces of fatty acid. Now transfer the oil to another tank and heat it by means of steam. Continue the process until the oil is clear and begins to bubble. In this way the bad smells will be removed. After this pump it into an automatic weighing apparatus and run into moulds where it is allowed to cool. Heating in the open fire will spoil the whole mass.

2894 S. V. A. M., Tuticorin—You may enquire of News Agency, Kothawalsavadi Street, Trichinopoly. You may go through Careers of Agents and Middlemen published from this Office. For commercial correspondence you may consult Mercantile & Mail Order Letters and Methods by K. M. Banerjee published from this Office.

2895 H. C. K. P., Feroke—(1) Yes, you may use a flask of $\frac{1}{2}$ gallon capacity. (2) You need not boil gallnuts and cloves. (3) Let gallnuts and cloves be digested in water for which pour water in the above and leave aside till the solution becomes deep black. (4) Write with solution and if writing be of deep black colour when dried it will indicate complete digestion. (5) You may try formula No. IX on page 85 of Manufacture of Inks.

2896 P. R. R. K., Amritsar—Formulas you require will appear in an early issue of Industry.

2899 M. S., Ahraura—You may start a co-operative bank. For particulars write to Co-operative Department of your province.

2900 M. J. M. C., Zanzibar—(1) Process of manufacturing all kinds of toilet preparations will be found in Indian Perfumes Essences and Hair Oils published from this Office. (2) Raw materials required may be had of Paradise Perfumery House, 75, Colootola Street, Calcutta. (3) Dealers generally do not send free samples of perfumes. (4) All the chemicals you require

may be had of B. K. Paul & Co., 1 & 3, Bonfields Lane, Calcutta. (5) For the machine required you may write to W. J. Alcock & Co., 7, Hastings Street, Calcutta. (6) Castor oil may be had of Khimjee Hansraj, 165, Lower Chitpur Road, Calcutta. (7) Coconut oil may be had of Shri Krishna Oil Mills Co. Ltd, Mangalore, S. Kanara and Dharsey Khetsey's Oil Mills, Palluruthi, Cochin. (8) Pomade is used in hair instead of hair oil. (9) Hand sprays may be had of D. N. Bhattacharjee & Sons, 33, Canning Street, Calcutta. (10) Process of making non-alcoholic perfumes will be found in July, 1934 issue of Industry. (11) You may go through some of our publications. (12) Formulas of pomade, metal polish, blanco, etc., will be found in Prospective Industries published from this Office. (13) Easy process of manufacturing essential oil is not known. (14) An article on packing will appear in an early issue of Industry. (15) For scented cards write to Shah & Co., 55, Ezra Street, Calcutta. Reply to all other queries has already appeared in Industry.

2902 E. A. H., Madras—Process of vinegar making appears elsewhere in this issue.

2906 B. M. R. P. L., Rawalpindi City—For selling fruits you may communicate with G. D. Thacker & Co, 337, Old Market, Shaik Memon Street, Bombay and Ratansi Korji & Co., 339, Old Market Juma Musjid, Bombay.

2910 S. K. P., Muttra—Envelope making machines may be had of Oriental Machinery Supplying Agency Ltd, 20, Lall Bazar Street, Calcutta.

2913 J. R., Simla—Yes you may start tea business. It will be advantageous for you to buy from auction sales and after blending, distribute among the stationers, retailers and wholesalers also. For this purpose you have to appoint an agent in Calcutta who will buy on your behalf and send the goods to you. You will blend it and after packing sell in the market. You may also supply to mofussil dealers in lot taking

TOILET SOAP BASE.

MANUFACTURERS AND DEALERS.

Do away with the laborious task of soap boiling. We will supply you with perfect toilet soap base (Chips), ready for passing through your milling plant. Most economically, without trouble, you can prepare your own toilet soap with your own brand.

Even if you do not own a soap milling plant, we will supply you with a perfect toilet soap, with your own name. We would perfume the soap to your choice, and the colour too, you could suggest. Our soap base is guaranteed for purity, being made under the supervision of a qualified German Chemist. Ask for Samples and prices:

New milling and plodding soap machinery just received, for sale. Moderate price.

TOMSON & CO., SOAP SUPPLIERS: 129, Khetwadi, Bombay 4.

some profit. In the beginning you may start the business with Rs. 1,000. In the whole of India Calcutta is the only place where weekly auction sales are carried on regularly.

2017 S. P. J., Tumsar—Lead pencils may be had of F. N. Goptu & Co, 12, Belliaghata Road, Calcutta and Madras Pencil Factory, Washermanpet, P. O. Box 84, Madras.

2018 V. S. S. P., Trivandrum—(1) There is no such institute in India where training is given on photography and cinematography and diploma is given to the passed students. (2) Following is a list of photographers: G. S. Trilokekar's Fine Art Works and Photo Saloon, 21, Kolbhat Lane, Kalbadevi Road, Bombay 2; Hamilton Studios Ltd., Graham Road, Ballard Estate, Bombay; Wellington & Ward Ltd., Cooks Bldgs, Hornby Road, Bombay; Agfa Photo Co., 13C, Russel Street, Calcutta; C. Guha, 15, College Square, Calcutta; Crown Photo Studio, 12, Chowringhee, Calcutta; Sen's Studio, 183, Dharamtala Street, Calcutta; Photo Emporium, 3-169, Mount Road, Madras and Universal Studio, Mount Road, Madras.

2019 H. H. R. S., Taldena—Process of making vegetable oil and artificial ghee will be found in Vegetable Oil Industry published from this Office. Two articles on match manufacture will be found in January and February 1932 issues of Industry.

2020 U. G. P., Bombay—Formulas you require will appear in an early issue of Industry.

2022 M. I., Ferozepore Cantt—It is advisable for you to advertise in papers of Afghanistan, etc. for selling your boot polish and cream.

2023 B. P. M., New Delhi—You may train your brother in one of the following lines: tailoring, book-binding, silvering mirror, process block making, electro-plating and painting on glass, etc.

2024 U. S. T., Kampala—For tobacco cutting machine enquire of C. E. List Engineering Works, Naumburg Saale 14, Germany. For match making machine you may communicate with Phosphoros Spezialfabrik fur Zundholz-maschinen, Herrnskretsch, Czechoslovakia. The above firm will also supply you with estimates for starting factories with their machines.

2025 B. V. S., Adoni—For selling the apparatus invented by you first, of all print illustrated catalogues with some block illustrating the working of the apparatus. Distribute these catalogues widely so that you may sell these direct. If you intend to do business through agents you may appoint some as ordinary agents (not sole agent) with the terms best suited to you. You may also appoint travelling agents who will go from place to place and secure orders which

should be sent to you when you will deliver the goods direct to the parties.

2026 K. M. R., Ellore—(1) Arrowroot grown in the Bombay Presidency is known as Bombay arrowroot. (2) Resorsin is a kind of dye which may be had of Fuzlehussain & Bros., 44, Armenian Street, Calcutta. (3) Perchloride of tin is also known as stannic chloride which may be had of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta. (4) One pint is 1½ lbs. (water).

2027 K. A. S., Rajahmundry—(1) For China clay powdering machine you may enquire of Industrial Machinery Co, 14, Clive Street, Calcutta. (2) Process of extracting rubber from old rubber tyre appears in December 1934 issue. (3) Process of quick tanning appeared in January 1934 issue of Industry. (4) Process of dyeing leather will be found in June 1934 issue of Industry. (5) Rose chandan wood has some medicinal properties and it is used as an ingredient in some ayurvedic preparations. (6) Process of extracting cotton seed oil will be found in Vegetable Oil Industry published from this Office.

2030 M. D. B., Bilaspur—(1) Following is a recipe of depilatory powder: Orris root 1 part; calcium carbonate 2 parts; barium sulphide 4 parts; borax 1 part. Take barium sulphide in the form of a lump and introduce into a mild furnace, preferably charcoal or cake for 5 to 10 minutes when it will get decolorised yielding an ashy tint. Take out and cool down. Also treat calcium carbonate in lump in a similar manner. Put them together into a stone mortar and triturate as finely as possible, next combine together orris root and borax according to the above process. Lastly make union of both the products in the same mortar for half an hour. A teaspoonful of this powder serves for each application. (2) Following is a recipe of tartar removing tooth powder: Sodium benzoate 50 grams; silicious earth 950 grams; erythrosin 3B 1 gram; gluside 1-5 gram; cassia oil 4 c.c.; clove oil 8 c.c.; menthol 3 grams. Mix thoroughly (3) Other formulas you require will be found in Pharmaceutical Preparations published from this Office.

2031 A. A., Calcutta—Process of removing cigarette stains on fingers will appear in an early issue of Industry.

2032 G. R., Cuddapah—You may consult Industry Year Book & Directory published from this Office.

2033 B. C., Bhavnagar—(1) Process of manufacturing bindi will be found in May 1934 issue of Industry. (2) June 1933 issue of Industry contains a recipe of marking ink. (3) Process of manufacturing disinfectant fluid will be found in Manufacture of Antiseptics and Disinfectants published from this office.

2934 C. N. K., Quetta—Jari borders may be had of I. C. Gandhi, 462, 463, Limbu Street, Surat; Ranelhod Bhaichand, Manchupura, Surat and Vaju Bhai Chunilal, Gopipura, Surat.

2936 G. M. S. G., Bangalore City—Following is a list of rubber goods manufacturers: Bhattacharya Rubber Works, 18, Sura East Road, Belegghata, Calcutta; Bengal Waterproof Works, 2, Nazarah Lane, Ballygunge, Calcutta; United Rubber Works, Tiljala Road, Calcutta; Bata Shoe Factory, Konnagar, E. I. Ry. and India Rubber Goods Manufacturing Co., Manicktala Main Road, Calcutta.

2937 P. L. M., Malda—Lakhi is a variety of round oyster.

2940 K. M. K. M., Karur—Process of discharge printing will be found in October 1934 issue of Industry.

2941 H. G. A., Shikarpur—You may consult Cotton Dyeing and Printing published from this Office.

2944 A. V. R., Bombay—You may introduce hiri making, embroidery, hosiery industry and handloom weaving among the widows. Supply them the raw materials, give them some remuneration and sell the finished product in the market. You have to organise the workers and sell the goods. Cigar making, paper bag making etc, may also be taken up by ladies. Moreover, these industries do not require large investment.

2945 P. T. C., Bombay—Process of manufacturing vegetable ghee will be found in Vegetable Oil Industry published from this Office. Refine the tallow thoroughly then melt it and mix thoroughly with groundnut oil.

2946 S. M., Bombay—(1) For a recipe of sore throat consult a physician. (2) You perhaps mean preserving fish with smoke. For this purpose cut the fish in halves and after cleaning soak them in brine for 24 hours. Then take out and hung on lines in a smoking box, which is nothing but a large air-tight packing box, placed on the ground with an inlet for the passage of smoke into it. This inlet is connected with a hole dug in the ground to burn any good smoking material, such as saw dust, paddy husk, etc. The time for smoking varies with the size of the fishes to be smoked. It ranges however from 12 to 24 hours but in the case of metal it takes longer. Experience will show how long to smoke fish so as to get the best colour, texture and flavour. After making is complete, dry the fish in the sun for 2-3 days. Then wrap each slice separately in parchment or wax paper and put in a box for storing. (3) Process of making gelatine capsule will be found in October 1933 issue of Industry

2948 R. C. N., Balasore—(1) Yes, you may start a joint stock company. For particulars regarding rules and regulation you may go through a book on Indian Companies Act. (2) For securing services of an accountant and head clerk you may advertise in newspapers. (3) You may consult Business Organisation and Practice of Commerce by S. M. Bose and A. K. Banerjee published by Book Company Ltd., 4/4A, College Square, Calcutta. (4) You may consult A. Mitra & Co., 74, Raja Rajbullay St., Calcutta. (5) For books on commercial subjects you may write to Thacker Spink Co. (India) Ltd, 3, Esplanade East, Calcutta. (6) As far as we know no Bengali book on commerce is available.

2949 M. A. J. S., Tura—(1) Imperial Tobacco Co. Ltd., Virginia House, 37, Chowringhee, Calcutta are agents of W. D. & H. O. Wills, London. (2) For Japanese cement, paint, varnish, etc, you may write to Mitsui Bussan Kaisha Ltd., 100, Clive Street, Calcutta. (3) Following is a list of glass bangle manufacturers: N. G. Worde, Bassein Road, Thana; Hanuman Glass Works, Firozabad, Agra; and Girwardhari Lal Mohanlal Agarwal, Firozabad, Agra. (4) Wants to be introduced to Indian agents for Lambert & Butler of London.

2953 S. R. R., Saharanpur—You may negotiate with Spicers Ltd, Redcross Street, Southwark, London S. E. and London Card & Board Co., Endurance Works, Tynte Street, London E 9 for required cardboard.

2955 C. S. N. C., Sakshigopal—Following is the process of manufacturing banana meal: Selected green bananas are put into water at 80°C to facilitate peeling and, after keeping in the water from four to five minutes are removed, peeled and introduce into a vacuum drier. They are stirred while drying for about two hours. The mass is then passed through sieves with 120 meshes to the square inch.

2956 M. A. G., Kerbala—An article on date sugar manufacture will be found in December 1934 issue of Industry. Process of manufacturing sugar from beet will be found in Manufacture of Beet Sugar by F. Murke.

2957 S. D., Madras—(1) For taking agency you may negotiate with Bihar Miscellany, 2,

WANTED

Respectable and influential agents and organisers on decent pay or handsome commission according to ability.

THE SANGUINE INSURANCE CO., LD.,

Head Office:—98/4, Clive Street.
Branch Office:—83/12, Belgachia Rd., Cal.

2985 N. G. R., Vizagapatam—You may take up manufacture of soap. Process of manufacturing soap will be found in Manufacture of Soap published from this Office. You may start a soap factory with Rs 1000 as initial capital

2988 W. A. W. K., Dehiwala—There is no such university known to us.

2990 M. V. S. R., Tenali—Button making machine may be had of Oriental Machinery Supplying Agency Ltd., 20, Lall Bazar Street, Calcutta.

2991 R. M., Calcutta—Hydrogenating machine may be had of Marshall Sons & Co. Ltd., 99, Clive Street, Calcutta.

2994 P. N. J., Nairobi—(1) Casein is used in medicines as a nutriment Casein is now extensively used as a substitute for celluloid which is highly inflammable in character In electro-technics it plays an important part as an insulating material. Artificial tortoise shell, artificial amber ivory, combs and all kinds of objects in common use of various shapes and colours are mainly made of casein. Wall-paper, photographic paper and coloured paper are manufactured with the addition of casein in order to attain a high glaze. Casein is also used as an adhesive and cement. In the textile industry it has been employed as a dressing and colour fixing medium and promises to supply a long-felt want in the cotton industry. (2) Cow's milk contains 2 p.c. casein (3) You should invest at least Rs. 10,000 to start a factory for manufacturing casein, milk-sugar, etc (3) Paper pulp is manufactured by Indian Paper Pulp Co, Naihati, 24, Parganas, Bengal. (4) Yes, paper pulp is imported in large quantity every year. (5) For the book on casein manufacture write to W. & G. Foyle Ltd. 119-125, Charing Cross Road, London W. C. 2

2995 J. R. G., Ahmednagar—Following is a list of footwear manufacturers: National Tannery Co. Ltd, Pagladanga, Entally, Calcutta; Siddiq Shoe Factory, 24, Lower Chitpur Road, Calcutta; Imperial Swadeshi Shoe Factory, Bazar, Billimaran, Delhi; Modern Boot House, Connaught Place, Delhi; Shahganj Shoe Factory, 400, Raza Manzil, Agra; and Wazirpura Shilpa Ashram, Wazirpura, Agra.

2996 S. S., Bombay—(1) Yes, you may start perfumery industry with small capital in the beginning. (2) Process of refining and deodorising til oil and coconut oil will be found in Indian Perfumes, Essences and Hair Oils published from this Office. (3) Hosiery industry is flourishing in Bengal and the Punjab. (4) An exhaustive article on hosiery industry appeared in December 1930 issue of Industry. (5) It is not possible to manufacture needles on a small scale. (6) Button making machine may be had

of Industrial Machinery Co., 14, Clive Street, Calcutta. (6) You may try any of the following industries: Ink manufacture, bindi making, syrup manufacture, cigar making, etc.

3000 R. N. B., Alwar—For machines you require enquire of Marshall Sons & Co. Ltd, 99, Clive Street, Calcutta.

3002 B. C. W., Kathiawad—(1) Creosote may be had of Crow Catchpole & Co. Ltd., Aldwych House, Aldwych, London W. C. 2 and Miki Shogenkan, 1, Surniyoshicho, Higashi-ku, Osaka, Japan. (2) Thermometer may be had of C. Sehlgeimilch Schmieldefeld 12, Germany; Bogel & Letsch, Ilmenau i Thuringen, Germany; H Morishita & Co., 543, Tamaboricho, Higashi-ku, Osaka, Japan and The Utsunomiya, 17, Awajimachi 1-Chome, Higashi-ku, Osaka, Japan. (3) Empty bottles may be had of Canning Town, Glass Works, Ltd., New Bridge Street House, 30-34, New Bridge Street, London E. C. 4; International Bottle Co. Ltd, 48, Fore Street, London E. C.; Miyasuzugo Glass Works, 13, Tsurunomachi Kitaku, Osaka, Japan; Okuda Glass Factory, 36, Nagara Higashidori 1-Chome, Higashiyodogawaku, Osaka, Japan; Erust Witter A. G., Unternoubrunn Bi Thur, Germany and Muller & Co., Piesau 11, Thur, Germany. (4) Following is a list of health journal; Health News, 63, Grove Road, Bow, London E 3 and Healthy Life, 3, Tudor Street, London E. C. 4.

3004 P. R. N. M., Ballipadu—(1) Process of manufacturing imitation gold and rolled gold will be found in December 1934 issue of Industry. Complete list of imitation gold manufacturers is not available. Rolled gold ornaments may be had of Indian Scientific Rolled Gold House, 25, Harrison Road and Calcutta Rolled Gold & Carat Gold Syndicate, 8/9, College Street; both of Calcutta (2) Tin boxes are made by Bengal Tin Box Manufacturing Co, 1, Jadu Mitter Lane, Shambazar, Calcutta. (3) Seeds and plants may be had of Globe Nursery, 25, Ramdhone Mitter Lane, Calcutta; Nurjehan Nursery, 2, Kankurgachi 1st Lane, Narkeldanga, Calcutta; and Pestonji P. Pocha & Sons, 8, Napier Road, Poona Camp. (4) Industry Year Book and Directory is sold to our subscribers at half price. (5) Mail order business is mainly conducted by post. You may however consult Money Making by the Mail by K. M. Banerjee. If you go through the book you will get all information regarding mail order business. (6) There are many homeopathic institutions but the diploma granted by them is not recognised by the Government. Following is a list of homeopathic institutes: Bengal Allen Homeopathic College, 168A, Bow Bazar Street; R. C. Nag Regular Homeopathic College, 166, Bowbazar Street and The Calcutta College of Homeopathy, 266, Upper

Circular Road; all of Calcutta. (7) The joint stock companies are in fact concerns with limited liabilities of all partners and they are registered under the Indian Companies Act. When it has been registered the word "Limited" should be in all cases be used with the name whenever it is used. Any violation of this is liable to bring prosecution on the head of the directors. A company may also be formed as a private limited company. It will have the advantage of company regulation and limited liability and at the same time bring the personal element, the individual enterprise which are to a great extent responsible for success. It will save much annoyance of public interference. For detail information on the subject you may consult *How to Do Business* by N. Banerjee. (8) Articles dealing with progress of industries appear from time to time. (9) Japanese goods are now cheapest. (10) Japanese motor cars have not yet been imported. For Japanese goods you may write to Mitsui Bussan Kaisha & Co. Ltd., 100, Clive Street, Calcutta. (11) Label on match boxes indicates the excise duty on match per gross of match boxes. (12) Consul-General is generally interested in commercial and political welfare of the country he represents. (13) Following is a list of Directory publishers: Thacker Spink & Co. (India) Ltd., 3, Esplanade East, Calcutta; Business Directory of India Burma & Ceylon published by The Kanara Press, Madras; London Directories Ltd., 25, Abchurch Lane, London E.C.4 and Kelly's Directory Ltd., Strand, London W. C. and Kenya Annual & Directory published by The Caxton (B. E. A.) Ptg. & Pub. Co. Ltd., Nairobi, Kenya. (14) You have to erect a dynamo for electrifying your house. (15) For starting crossway puzzle competition you need not take Government permission. (16) Publication of Commercial India and Bread & Freedom has been suspended. (17) No. (18) You better consult a lawyer. (19) You should read some books on import trade. (20) No other cheap substitute for kerosene and salt is available. (21) Yes, business information bureau has a great prospect. (22) You may go through Vegetable Oil Industry published from this Office. (23) Thank you for your valuable suggestion.

3005 V. A. H., Madras—Yes, you may start mango chutney business. You should try to sell the articles in foreign countries. So you should manufacture the articles according to the taste of foreigners, should pack in well designed cartons which will be strong enough to guarantee safe delivery to the destination.

3003 B. K. B., Jhang—(1) Following is a process of making waterproof glue: Soak any desired quantity of glue in clean water for 12 hours, then pour the water off and stir the glue

into a paste. On the other hand, take $\frac{1}{4}$ th the quantity of glue of isinglass, cut it in small pieces, soak for 12 hours in methylated spirit, and then rub it into a paste. Place an earthen pot on the fire and gradually put in portions of the glue and of the isinglass; stir constantly, add a few drops of linseed oil varnish, strain through a clean cloth and put the glue in bottles for future use. (2) 600 c.c. water is about 21 fl. oz. water. (3) Following is a good recipe of brilliantine: Suet 40 oz.; wax 40 oz.; sesame oil 40 oz.; Melt in a water bath, and under assiduous stirring, so as to make a foamy mixture; add castor oil 21 oz., tragacanth mucilage 20 oz. The last ingredient must be a thick preparation made with rose water. Brilliantines are sold by stationers. (4) Caustic soda lye 40°Be denotes density of the lye measured by Beaume's hydrometer.

3012 A. K. R., Vizianagram—No such article is available.

3013 V. S. Bellary—(1) Lantern slides are made by freehand drawing with transparent colour. (2) You should not use ordinary photography plates and films in making block. (3) An alloy which is to serve for type metal must allow of being readily cast, fill out the moulds sharply, and be as hard as possible. It is difficult to satisfy all these requirements entirely, but an alloy of antimony and lead answers the purpose best. You may try the following formula: Lead 61.3; antimony 18.8; tin 20.2. All the ingredients by parts in weight. Types are generally manufactured from the alloy by casting. (4) Copper treated as follows becomes harder and tougher than commercial hard copper: Take 2 lb. of alum and 8 oz. of arsenic mix well. 40 lb. of copper is to be used with this quantity of alum and arsenic. When the copper is thoroughly melted the alum and arsenic are poured in the crucible, and mixed well with the melted copper. The copper is then poured and allowed to cool gradually. (5) The same camera cannot be used both for photography and blocks.

3014 K. K. R., Masulipatam—As far as we know the stamps have no use. You may however write to Indian Philatelic Co., 1, Lindsay Street, Calcutta.

3015 P. L. K., Ajmer—(1) For the machine you may write to Shams Bros., Premnagar, Cawnpore. (2) Ink stains on gelatin pads is removed by sponging it off with hot water, which melts the stained surface sufficiently to allow of its being rubbed away. The jelly should then be re-melted and a flat surface obtained for the next time it is required. Boiling the jelly must be carefully avoided as bubbles form in it when this is done and bad surfaces and imperfect copies are the result.

3017 C. K. D., Kapadwanj—(1) An article on gramophone record manufacture will appear in an early issue of Industry. (2) You may start a sugar factory with Rs. 20,000. Two articles on sugar industry containing an estimate for starting a factory will be found in October and November, 1934, issues of Industry.

3022 N. C. A., Castle Rock—For tin can making machine write to Taylor & Challen Ltd., Birmingham, England. Tin plates may be had of Indian Tin Plate Co., Golmuri.

3025 S. N. S. S., Atru—(1) You better put an advertisement for the man you require (2) Wooden plank may be had of Motilal Radhakissen, 67-26, Strand Road; Ramprosad Brijlal, 67-10, Strand Road and William Major & Co., 4, Mangoe Lane; all of Calcutta. (2) For packing paper write to C. M. Sur & Co., 105, Radha Bazar Street, Calcutta. (3) You may consult Thacker's Indian Directory published by Thacker Spink & Co. (India) Ltd., 3, Esplanade East, Calcutta and Times of India Directory published by Times of India Office, Bombay. (4) Refer your query to the Agricultural Department of your province. (5) For embossed printing write to Lal Mia, 89, Baitakhana Road, Calcutta and S. Golam Nobi, 5, Kali Bose Lane, Calcutta.

3027 P. G. T., Ahmedabad—For books on carpentry write to Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta. You may consult Handicrafts published by Odham Press Ltd., 85-94, Long Acre, London W. C. 2.

3030 D. C., Nepal—You may consult Bangkok Times; Siam Weekly Mail; both of Bangkok.

3034 K. S. G. R., Akola—You may write to K. R. Lingam, 9/22, Palthori Vari Street, Vizianagaram for planchette.

3035 K. S. R., Polanur—(1) A cheap manure consists of sulphate of ammonia 60 lb.; nitrate of soda 40 lbs; ground bone 250 lbs.; plaster 250 lbs; salt $\frac{1}{2}$ bushel; wood ashes 3 bushels; stable manure 20 bushels. (2) Fertilisers may be had of Acme Fertiliser Works, "C" Block, Hide sheds, Kidderpore Docks, Calcutta; Atlas Fertilisers Ltd., 4, Bankshall Street, Calcutta; Chilian Nitrate Committee, 7, Hastings Street, Calcutta and Ewing & Co. Ltd., 4, Clive Row, Calcutta.

3036 N. I. T. S., Srinagar—(1) Following is a list of clearing and forwarding agents: Jeena & Co., Gresham Bldgs, 45, Esplanade Road, Fort, Bombay; Padamsini Kanji, Gaumukhi Bhuvan, 10, Musjid Bunder Road, Bombay; Bysack Landing & Shipping Agency, 26A, Clive Street, Calcutta; Eastern Shipping Agency, 8, Dalhousie Square, Calcutta; M. P. Dastur & Co., Bunder Road, Karachi and Premier Shipping & Clearing Co., Bunder Road, Karachi (2) Following is a list of cinema film producers: Im-

perial Film Co., Kennedy Bridge, Bombay; Sagar Film Co., Bombay; Sarda Film Co., Tardeo, Bombay and The Punjab Film Co., The Mall, Lahore.

3037 B. P. G., New Delhi—Process of removing stains will appear in an early issue of Industry.

3038 H. R. S., Ahmedabad—(1) Yes, you may manufacture vinegar and sell in the market. Capital to be invested depends upon the scale of the business. Vinegar is mainly consumed by Europeans. An article on vinegar manufacture appears elsewhere in this issue. (2) You may start the business of ink manufacture with Rs. 500 as initial capital.

3039 R. M. P. L., Nova-Goa—Envelope making machine may be had of Oriental Machinery Supplying Agency Ltd., 20, Lall Bazar Street, Calcutta.

3041 S. S., Peshawar—Japanese motor cars have not been imported into India.

3042 R. K. A., Castle Rock—(1) Process of manufacturing pickles will be found in Indian Pickles Chutneys and Morabbas published from this Office. In this book you will find everything regarding packing etc: You should use machines for air-tight packing. Machines may be had of Oriental Machinery Supplying Agency Ltd., 20, Lall Bazar Street, Calcutta. Pickles will keep in good condition in glass bottles. For Chinaware you may enquire of Satcowrie Das & Sons, 191, Old China Bazar Street, Calcutta.

3043 D. S., Gohana—Take coconut-oil 1 md., caustic soda $8\frac{1}{2}$ seers, soda silicate 10 srs, soda carbonate 2 srs., salt 4 srs., soap stone 10 srs.,

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THE HINDUSTHAN SOAP WORKS,
Dept., I, Nawashahr, Deoba, (Punjab).

water $1\frac{1}{2}$ mds. Dissolve the caustic soda with 25 seers of water. Run the oil into the soap boiling pan, add the caustic solution gradually, a little at a time and boil until a pasty stage is observed. If the soap tends to adhere to the bottom of the pan add the salt which will prevent the adherence. Go in boiling, occasionally adding water if necessary until the soap is completely saponified and when you are sure of saponification, add sodium silicate, carbonate, and soap stone one after another, crutching all the while and gradually adding water till the soap comes to required consistency. This requires some experience in manipulation and for this reason adulterated soaps especially a very cheap variety are difficult to be prepared by inexperienced hands. The quantity of water mentioned is not the exact quantity to be understood because in full boiling methods it can not be so given. It depends upon the consistency of the soap to be determined by finger tip when cold. The quantity of soap thus produced will weigh about $3\frac{1}{2}$ mds and fill cost from 6 to 7 rupees per md. (3) See the table given in our book on soap you have. (4) 76/77% solid and 98/99% flake caustic sodas are same in strength so of flake caustic 98/99% 300 lbs. lye of 36°B will be required.

3044 T. S. N., Bangalore City—(1) It will be very difficult for you to make statue without practical training. From books you may gather theoretical instructions but without practical training you will not be able to be a good artist. (2) For moulds for concrete casting write to Balmer Lawrie & Co. Ltd., 103, Clive Street, Calcutta. (3) Plaster of Paris, may be had of Calcutta Mineral Supplying Co. Ltd., 31, Jackson Lane, Calcutta. (4) Process will appear in an early issue of Industry.

3045 N. B., Rajkot—A good formula of washing soap will be found under No. 3043.

3050 E. A. G. A., Bombay—For the machine you may enquire of Oriental Machinery Supplying Agency Ltd, 20, Lall Bazar Street and Industrial Machinery Co., 14, Clive Street; both of Calcutta.

3051 A. E. S., Ambalangoda—Process of transferring pictures will appear in an early issue of Industry.

3052 G. R., Yerraguntla—(1) Turpentine oil is also known as spirit of turpentine. (2) You better consult a physician. (3) Wool fat is known as lanoline. (4) 30°Be denotes the density of the lye as measured by Beaume's hydrometer (5) Animal charcoal is made by carbonising bones of animal in an iron retort. (6) Process of refining beeswax follows: Bichromate of potash 14 parts; sulphuric acid 42 parts; water 42 parts; crude beeswax 224

parts. Dissolve the bichromate in water and add the acid. In a pan melt crude wax slowly, allow the dross to settle and then stir. Now gradually pour the solution already prepared, stirring all the time. When wax becomes light green and comes to the surface dip into the tub, add 1 p.c. oxalic acid, boil one hour, allow to settle, transfer into another tub, add 10 gallons of hot water. Boil another one hour allow to settle and make block. (7) You can distill water in a distilling plant. (8) You may start a soap factory with Rs 1000. (9) Tamil equivalent of soap stone is Bulpam; Tamil equivalent of pearl ash is Maranppu; Tamil equivalent of cumin seed is cheerakam; Tamil equivalent of cayenne pepper is Molagay. (10) Refer your query to the Excise Department. (11) Process of preserving eggs will be found in December 1934 issue of Industry. (12) Lime slaked by exposure to air is known as air slaked lime. (3) For preparing orange flower water you may follow the following process: Orange flowers 5 lb; water 10 lb. First put the fresh orange flowers in an earthen vessel, close the mouth with a plate sealed with mud; apply gentle heat for 3 hours and allow to cool. Strain when cold and the filtrate will be good orange flower water. (14) Following is a good recipe of dentifrice: Salol 25 grams; saccharine .004 gram; oil of peppermint 5 grams; oil of cloves 1 gram; oil of caraway 0.5 gram; rectified spirit 1 litre. Mix. (15) Chemicals may be had of B. K. Paul & Co. Ltd, 1 & 3, Bonfields Lane, Calcutta. (16) Macerate is to soften by steeping. (17) A good formula of pomade will be found in (16) Macerate is to soften by steeping. (17) A good formula of pomade will be found in December 1934 issue of Industry. (18) Process of manufacturing liquid shoe polish will appear in an early issue of Industry. (19) Suet is known as Sevum Preparatum (prepared suet) in medical term. (20) All the ingredients you require may be had of B. K. Paul & Co. Ltd, 1 & 3, Bonfields Lane, Calcutta. (21) Process of transferring photos will appear in an early issue of Industry.

3034 P. O. F., Thayetmyo—Yes, you can pack the pain balm in tin cans. It will be efficacious in all kinds of pain including headache etc.

3057 P. S. B., Rawalpindi—(1) Nut buttons for coats are not manufactured in India at present. (2) For selling used postage stamps you may negotiate with Calcutta Philatelic Co., 1, Lindsay Street, Calcutta. (3) Process of refining Til oil will be found in December 1934 issue of Industry.

3058 S. N. K., Srinagar—(1) If you manufacture soap exclusively with mustard oil the soap will be very soft and will not be marketable. You can only mix the oil with other oils

or tallow. If you go through the table on page 31 of Manufacture of Soap you will get saponification value of all kinds of oils. (2) Yes you can use 98-99% caustic soda for 76-77%. (3) A good formula of washing soap will be found under No 3043 (4) You better consult a mechanical engineer who will help you in making a machine. (5) For ribbon fabric you may enquire of C. M. Sur & Co., 105, Radha Bazar Street, Calcutta. For rolling machine you may enquire of Industrial Machinery Co., 14, Clive Street, Calcutta (6) Process of making red typewriter ribbon will appear in an early issue of Industry.

3059 R. S. R. I., Cochin—(1) Banana meal is a nutritious food for infants and invalids. (2) You have to create demand for banana meal both in India and abroad. (3) Following is a process of preparing banana meal: Selected green bananas are plunged into water at 80°C. to facilitate peeling and after remaining in the water from four to five minutes are removed peeled and introduced into a vacuum drier. They are stirred while drying for about two hours. The mass is then passed through sieves with 120 meshes to the square inch.

3065 P. K., Kurnool—(1) The gummy resin from which asafoetida is made is obtained by founding the upper part of the root of Ferula Foetida. It is found in Eastern Persia and in Khorasan. (2) Its natural colour is blackish brown. For making white variety you may adulterate with gum arabic. (2) Yes you may start a soda shop. For machines you may enquire of Little & Co., 2, Grants Lane, Calcutta. Detailed process of making mineral water will be found in Profitable Industries published from this Office. (3) For cinematograph write to Pathe Cinema Ltd., Ballard Estate, Bombay.

3066 B. H. N. S., Nepal—(1) For rice huller write to Ghatak Co., Rai Bahadur Road, Behala, Calcutta and Bery Bros, 15, Clive Street, Calcutta. Emery wheel may be had of Alfred & Herbert (India) Ltd., 13½, Strand Road, Calcutta (3) Other articles you require may be had of

N. A. Hussanally & Co., 28, Strand Road and Santosh Kumar Mullic & Son Ltd., Meerbohor Ghat, Lohapatty, Barabazar, Calcutta

3067 C. L. P., Membasa—Process of refining coconut oil will be found in March 1934 issue of Industry.

3068 P. V. S., Proddatur—(1) Process of manufacturing all kinds of snuff will be found in Indian Tobacco and Its Preparations published from this Office. (2) A formula of tooth powder will be found in October 1934 issue of Industry.

3069 L. C. B., Ludhiana—Process of manufacturing camphor will appear in an early issue of Industry.

3073 T. N., Colombo—Following is the process of deodorising Cologne spirit: Cologne spirit 1 gallon; powdered quick lime 4 drachms, powdered alum 2 drachms; spirit of nitrous ether 1 drachm. Mix the lime and alum and add them to the alcohol, shaking the mixture well together; then add the spirit of nitre and set aside for 7 days shaking occasionally; finally filter

3075 D. P. S., Ahmednagar City—No such metal is available.

3077 A. L., Sargodha—(1) You can make a form of wood and take two knives. With the help of knives cut the paper in required shape apply gum where necessary. If you manufacture envelopes in this way you need not invest large sum. (2) Sesamum oil is Til or Gingelly oil (3) Wants to be put in touch with sesamum oil merchants in the Punjab.

3078 J. N. P., Maymyo—Process of removing white-ants from cane will appear in an early issue of Industry

3079 A. D., Dakshinhati—(1) An article on dyeing and printing will be found in October 1934 issue of Industry. (2) Wooden blocks may be had of Bharat Chitralaya, 355, Upper Chitpore Road, Calcutta (3) Colours may be had of Fuzlehussain & Bros, 44, Armenian Street, Calcutta (4) You may write to Government School of Dyeing & Printing, Cawnpore for particulars of dyeing course.



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Union Special High Speed Overlock
Machine for Hosiery Trade.

3080 S. K. M. Q., Chank—Process of manufacturing vegetable ghee will be found in Oil Industry published from this Office.

3082 L. S. B., Gujranwala—(1) The output of mica during the year 1932 was 32,713, cwt. valued at Rs 144 lakhs. Major portion of this mica is exported to foreign countries. The export of mica during the year 1932-33 amounted to 40,466 cwts of which United Kingdom took 18,429 cwt, Germany 5,998 cwt., France 1018 cwt U.S.A. 7881 cwt and other countries 7140 cwt. (2) You may refer your query to Indian Trade Commissioner, India House, Aldwych, London.

3084 U. K. B., Udipi—For cinema machines you may enquire of J. F. Madan & Co. Ltd., 5, Dharamtala Street, Calcutta.

3088 N. B., Jullundur City—Tin cans and bottles may be had of Shah & Co., 55, Ezra Street and Sikri & Co., 55, Canning Street; both of Calcutta.

3089 K. G. K. M., Razole—For floating a joint stock company you may go through Indian Companies Act.

3090 B. R. T., Akola—No such machine for boring amlas is available.

3091 R. K., Indore City—For removing small pox mark you better consult a physician.

3092 V. B., Rajkot—(1). An article on hair lotion manufacture will be found in November 1934 issue of Industry. (2) A good formula of vanishing cream will be found in September 1934 issue of Industry.

3097 V. S., Bezwada—(1) For cementing iron you may make a very stiff putty by mixing asbestos with sufficient white lead.

3098 S. V. N. R., Kistna—You better put an advertisement in daily papers for securing a suitable job

3099 T. D., Kathiawad—An article on tile making will appear in an early issue of Industry.

3101 R. R., Castle Rock—(1) Yes, you may preserve fruits and sell them out of season. For preserving fruits these are cooked in cane sugar syrup until these are clear tender and transparent. These should keep their form and plumpness and be crisp rather than tough or soft. When finished the cells of the fruit should be filled with flavoured syrup in place of the fruit juice. In preserving fruit care should be taken in introducing fruit in syrup. If the fruit is dropped at once in hot syrup that is too dense, the juice of the fruit will be drawn out so rapidly by this heavy liquid as to shrink the fruit. Then the outside surface becomes so coated with thick syrup that little of it can enter the fruit. In order to prevent this toughening and shrinking it is necessary to start the cooking of the fruit in a thin syrup. Detailed process will be found in Utilisation of Common Products

published from this Office. (2) Wants a loan of Rs 400/- for starting a profitable industry.

3102 C. K. D., Kapadvanj—Yes, you may start gramophone record making business. It seems to be prospective. There are only three factories in India manufacturing gramophone records. An article on gramophone record making will appear in an early issue of Industry.

3104 B. S. R., Ghazipur—(1) Following is a goor recipe of tooth paste: Precipitated chalk 16 lbs.; terra rosa 3 lbs.; powdered arcanut 1½ lbs.; oil of cloves 240 minims; oil of cinnamon 160 mins; glycerine 16 oz.; rosewater a sufficient quantity. Mix the powders, run through a 140-mesh sieve, sprinkle perfumes on, sift through a 40-mesh sieve then mash, adding rose water. (2) Following is a recipe of Taral Alta: Water 1 quart, scarlet dye 2 oz. Dissolve the dye in water and you will get good taral alta. (3) A good recipe of bindi will be found in May 1934 issue of Industry. (4) A formula of rouge for lips will be found in August 1934 issue of Industry.

3105 S. N. G. G. S., Coimbatore—For preserving ghee pack it in airtight tins.

3106 S. N. S., Ahmedabad—You better consult a physician.

3107 H. N., New Delhi—(1) You may refer your query to the Secretary, Association for the Advancement of Scientific and Industrial Education for Indian Students, 6, Old Post Office Street, Calcutta. (2) It is very difficult on our part to suggest names of firms who take apprentices. (3) You better write direct to the firms enquiring whether they take apprentices.

3108 R. N. B., Alwar—Marbles may be had of Narain & Co., Maneck Chowk; Rising Sun & Co., Ajmere Gate and Sorajmal Maliram, Tripoli Bazar; all of Jaipur City.

3109 I. F. S., Ahmednagar—Vide No. 2995 adbove.

3119 K. S. P., Kottayam—Process of making rolled gold will be found in December 1934 issue of Industry.

3121 M. V. V., Mysore—(1) Make a solution of ether 90 parts and carbon disulphide 10 parts and impregnate for 15 to 20 minutes. (2) In making impregnating solution you should use cold water. (3) For making denitrating solution you may take alcohol 90 parts and hydrofluoric acid 10 parts. (4) It will take about 10 minutes to pass dry gases of ammonia.

3122 A. H. P., Palej—(1) For dies for button moulds write to Ray's Industries, 33, Kankurgachi 2nd Lane, Narkeldanga, Calcutta. (2), Zari border may be supplied by Benedict & Danuheisser G. m. b. H., Nuernberg N, Acuss Bayrenther Str., 48, Germany. (3) For Christmas cards write to Fischer & Wittig, 12, Tenbner

Str., Leipzig, Germany and Goldner & Co., 47, Direksen Str., Berlin C25 (4) Stationery goods are manufactured by Dass & Co., 60, Sikdarbagan Street and F. N. Gupta & Co., 12, Beliaghata Road; both of Calcutta. (5) You may consult Wide World English Correspondence by K. M. Banerjee published from this Office.

3124 C. N. K., Kolhapur—An article on carbon paper and typewriter ribbon manufacture appeared in March 1934 issue of Industry.

3125 C. K. D., Kapadwanj—An article on paper clip making appeared in April 1931 issue of Industry.

3126 P. U. B., Chawinda—As you have got some experience in sporting goods business it is advisable for you to start a business concerning that line. Buy sporting goods from different manufacturers, stock them in your shop and sell them some in shop and some by door to door canvassing.

3127 G. S. G., Raipur—You may start the business of fret work and picture framing with a small capital if you buy the article from the market and adjust them properly according to requirement. Subsequently if the business be lucrative and at the same time interests you may develop the business further. You may buy machines from abroad and may make picture frame and fretwork yourself.

3131 M. T. C., Cawnpore—(1) Formulas of boot polish will be found in December 1934 issue of Industry. (2) A good formula of office paste will be found in February 1934 issue of Industry. (3) Bottles of required description may be had of Shah & Co., 55, Ezra Street, Calcutta. (4) You may strain ink through linen or muslin.

3132 P. C., New Delhi—You may use hair dyeing oil a formula of which will be found in July 1933 issue of Industry.

3134 N. N. S. P., Trivandrum—(1) Envelope and paperbag making machines may be had of Oriental Machinery Supplying Agency Ltd, 20, Lall Bazar Street, Calcutta. (2) Cardboard box making machines may be had of John Dickinson & Co, Grosvenor House, 21, Old Court House Street, Calcutta. (3) Home printer may be had of W. H. Sellers, 14, Hare Street, Calcutta.

3136 P. N. R., Bezwada—Pill making machines may be had of Dr. Bose's Laboratory Ltd., 45, Amherst Street and Industrial Machinery Co., 14, Clive Street; both of Calcutta.

3137 H. S., Sangrur—(1) You may start a weaving factory with improved type of hand-looms. M. A. Roy & Bros., Kalapur, Post No. 6 Ahmedabad and Desai Handloom Factory, Vago, Nadiad, Kaira will supply you looms and allied accessories. You may start the business on a small scale and develop the business with the

increase of demand. Yarn may be had of Bengal Luxmi Cotton Mills Ltd., 28, Pollock Street, Calcutta; Madura Mills Co. Ltd., Madura and Crown Spinning & Manufacturing Co. Ltd., New Parkdevi Road, Parel, Bombay.

3139 M. S., Cocanada—Cigarettes are manufactured by Zenith Tobacco Co., Bombay; National Tobacco of India Ltd., Belliaghata Road, Calcutta and Rameshwar Tobacco Co., 96, Grand Trunk Road, Salkia, Howrah.

3140 B. B. D. C., Madras—Process of manufacturing synthetic diamonds will appear in an early issue of Industry.

3141 S. M. H., Bombay—We have got no such books. You will however find recipes of toilet preparation in Indian Perfumes Essences and Hair Oils published from this Office.

3142 A. L., Sargodha—Refer to No. 3077 above.

3145 A. S. P., Rangoon—(1) Recipes of hair cream, cold cream, balm will be found in Prospective Industries published from this Office. (2) Process of manufacturing phenyle will be found in Manufacture of Disinfectant and Antiseptics published from this Office.

3146 S. M. S., Channur—(1) Process of manufacturing bricks and tiles will appear in an early issue of Industry. (2) Match making machines may be had of Bhowani Engineering Co. Ltd., 56, Gouribari Lane, Calcutta. (3) In preparing pomade you should not substitute any vegetable fat for benzoated lard. (4) A formula of washing soap will be found in December 1934 issue of Industry. (5) For metal pressing machine write to Taylor & Challen Ltd., Birmingham, England.

3148 P. C., Karachi—Process of manufacturing vegetable ghee will be found in Vegetable Oil Industry published from this Office.

3152 G. M. M., Sind—(1) Composition for sealing dry cell is not available in the market. You may prepare it yourself. (2) Wants to be put in touch with dealers in manganese dioxide in the Punjab.

3155 M. R. R. S., Nellore—(1) Bakery machines may be supplied by Habamfa Hallesche Backereimaschinen-Fabrik Ransch & Filbry, Ammendorf near Halle A. S. Germany. (2) Aerated water making machines may be had of Little & Co., 2, Grants Lane, Calcutta.

SUDHINDRA NATH SEN, M.Sc.,

(Applied Chemistry).

6 Kirti Mitter Lane, Calcutta.

Undertakes Chemical analysis of every type and gives practical advice on any manufacturing Industries.

3159 M. C., Kandhla—(1) Essences and essential oils may be supplied by Schimmel & Co., Miltitt bei Leipzig, Germany and Heine & Co., A-G, Leipzig, U. Groba, Germany. (2) Address of Consul-General for Germany is 3, Lansdowne Road, Calcutta and the address of Consul General for the Netherlands is E. 1. Clive Bldgs., Calcutta. (3) Labels may be supplied by Gebr. Jellert G. m. b. H., Klein Auheim, Hanan, Germany and Jellert & Ewald G. m. b. H., Gross Stenheim, Hanan, Germany.

3160 P. T. C., Bombay—(1) Two articles on match industry appeared in January and February 1932 issues of Industry. If you go through the article you will get all the information required. (2) Match making machines may be had of Bhowani Engineering Co. Ltd., 56, Gouribari Lane, Calcutta. They will also supply you with an estimate for starting a factory.

3161 T. R., Hyderabad—Formulas you require will appear in an early issue of Industry.

3162 B. G. S. N. K., Bandarulanka—You may enquire of Shah & Co., 55, Ezra Street, Calcutta, for labels.

3163 L. R. J., Betul—Process of purifying graphite will appear in an early issue of Industry.

3165 M. T., Khodar—(1) Coir yarn is manufactured by Empire Coir Works, Alleppey, Travancore; William Goodacre & Sons Ltd., Calcut Malabar; and Aspinwall & Co. Ltd., Calcut, Malabar. (2) Watches, etc., may be had of Oudh Watch Co., 43, Nazirabad, Lucknow, Minoo & Dinshaw, 57, Hazratganj, Lucknow, Deccan Watch Co., Budhwar Peth, Poona; Hardas & Co., 13, Sarafa, Indore and Crown Watch Co., Shahi Bazar, Hyderabad Sind. (3) Stove spare parts may be had of R. D. Dutt & Bros., 79½, Harrison Road, Calcutta. (4) Gramophone parts may be had of M. L. Shaw Ltd., 5, Dharamtala Street, Calcutta. (5) Electric fans may be had of Eastern Bengal Electric Co., 84½, Ripon Street, Calcutta and Electric Trading Co., 20, Park Street, Calcutta.

3166 N. K. R., Bezwada—Asbestos powder may be had of Asbestos & Belting Co. Ltd., 2, Clive Ghat Street, Calcutta and Don Watson & Co., 8, Lyons Range, Calcutta.

3167 C. L., Phagwara—Recipe of laxative sugar will appear in an early issue of Industry.

3168 J. S. K., Kopbal—Soap stamping machines may be had of Industrial Machinery Co., 14, Clive Street, Calcutta.

3169 R. B., Bareilly—All the chemicals you require may be had of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta. Indigenous ingredients may be had of Banishidhar Dutt & Sons, 126, Khengrapatty, Barrabazar, Calcutta.

3170 J. R., Simla—You may go through Indian Materia Medica by K. M. Nadkarni, Post Box 3558, Bombay 4.

3171 V. P., Gwalior—Following is the method of preparing dry ginger: The first operation is to soak the partially cleaned green stem. The soaking facilitates the removal of the outer skin. It is scraped off with a broken piece of earthenware. The scraped ginger is now washed and exposed for about three days to the sun. The ginger is thus bleached and dried and ultimately rubbed by hand. After this the ginger is put in the sun for three or four days and similarly rubbed again. It is now steeped in water for two hours and exposed to the sun until it gets dry. When dry it is rubbed on a coarse cloth so that the remaining outer skin from the previous operation is removed. It is then ready for the market.

3172 M. S., Alwaye—Spirit of wine is rectified spirit which may be had of D. Waldie & Co., 8, Clive Street, Calcutta.

3175 H. L. R. S., Hassan—For ice cream making machine write to Universal Mutual Benefit Co., 1009, Panchkuin Road, New Delhi and Satcowrie Das & Sons, 191, Old China Bazar Street, Calcutta.

3176 B. C. P., Ahmedabad—The formula you require will appear in an early issue of Industry.

3178 K. L., Chaman—There is no school where you can learn gramophone record manufacture. An article on the subject will appear in an early issue of Industry.

3179 C. C. M., Darbhanga—Process of manufacturing sand paper and emery cloth will be found in Profitable Industries published from this Office.

3180 M. A. S., Adra—Gramophone accessories may be supplied by Marchand-Monnier & Co. Ltd., Bienne E. Paillard & Co. Ltd., Ste. Croix; Garford Mfg. Co., Elyria, Ohio, U. S. A.; General Phonograph Corp., New York, U. S. A.; Nipponophone Co. Ltd., 69, Azuchimachi 2-Chome, Higashi-ku, Osaka, Japan and Parlophone Co. Ltd., 81, City Road, London, E. C. 1. and Vocation Gramophone Co. Ltd., 53, Norland Square, Holland Park Avenue, London W.11.

3181 M. L., Lahore—Mantle making machine may be had of Oriental Machinery Supplying Agency Ltd., 20, Lall Bazar Street, Calcutta and Indo-Swiss Trading Co. Ltd., 2, Church Lane, Calcutta.

3182 P. L. M., Karachi—(1) Following is a recipe of blue ink powder: Resorcin blue 5 parts; sugar 20 parts; oxalic acid 1 part. Pack in paper. (2) For making red ink powder take eosine 5 parts; sugar 10 parts. (3) There is no book, dealing with lead pencil and artists water colour manufacture. Process of manufacturing lead pencil will be found in January 1934 issue of Industry.

SPECIAL MACHINES FOR HOSIERY, BOOT & SHOE INDUSTRY.

The Union Special Machine Co., has been closely associated with the undergarment industry for over 50 years. In 1882 this Company revolutionised manufacturing methods with the now famous "Safe Elastic Stitch." The development of the industry since then is a story of unflinching progress.

In those days it was believed that only the rich could afford fine undergarments. Then the public began to learn that machine made garments were actually superior in durability and comfort. Because they could be made inexpensively, a great market was opened to manufacturers.

It is a tribute to the undergarment manufacturers the world over that they have been alert since then in capitalizing on all opportunities to improve their product. They have pioneered new styles and popularized new garments until even the humblest wardrobe now commonly include a selection of choice and beautifully made and smart undergarments which would have been the envy of the Victorian maid.

As a result of these developments customers have these days learnt to insist on garments which combine beauty and smartness with quality. Price is an important factor so that a careful check has to be kept on costs. In order to meet these conditions sewing equipment must have the speed to hold down production costs—and it must also produce quality work.

The Union Special Machine Company has all along kept well ahead in the design of their machines to meet these altering conditions the durability and elasticity of Union three thread overseaming and Union two thread hemming accomplished on their 39200 gives the manufactured undergarment a superiority fully appreciated by underwear manufacturers, whilst the high speed of these light running machines and their quicker acceleration and deceleration permitting full advantage of this high speed on short runs serve to increase production and reduce costs per manufacturing unit. Apart from these types the Union Special Machine Co. turn out a most comprehensive range of

machines for every sewing operation of the hosiery and clothing trade.

Turning to the boot and shoe trade in which connection sewing machines designed to accomplish the intricate and varied operations of modern boot and shoe manufacturing at high speeds and with a fine finish have resulted in the present era of elegant but inexpensive footwear and Union Specials have played no small part in this development their range of machines covering every sewing requirement of the boot and shoe manufacturer.

When we review the manufacture of bags, we find that "Union sewing" is the insistent demand of the bag buyers who recognise the superiority of the Union double lock stitch and the security it gives them in the bagging of their products. On this account Union Special Over-seaming and Hemming Machines operating at high speeds and using jute twine are now standard equipment in many of the Jute Mills.

The seamed closing of bagged products has had the careful study of the Union Special Machine Co., so much so that they can be considered specialists in this particular modern development and have produced a range of filled bag closing machines to suit special conditions of Flour, Sugar, Coffee Mills, Fertiliser Works, in fact any concern which bags its products. The lowered costs achieved by the speed of operation, the neat appearance, the finished seam presents, its secure and leakproof qualities are all convincing arguments in favour of the installation of Union Special Filled Bag Closing Machines, worthy of consideration of the go-a-head Mill proprietor.

It is true to say that "if it is sewn there is a Union Machine to do it." For the Canvas Trade the Union Special Machine Co., offer a variety of machines, particular interest being focused on their "Samson" Machine which overcomes all difficulties in handling wide canvas sections or heavy fabrics.

The distributors of Union Special Machines in India are Messrs. Don Watson & Co., 4, Lyons Range, Calcutta. Their demonstration and show room is located at 53, Bentinck Street, Calcutta, and they welcome enquiries from the Hosiery, Clothing, Boot & Shoe, Jute &c. trades. They are in a position to advise on

any sewing problem and will quote for suitable Union sewing equipment on application.

The best machines wear out and require repairs and renewals in time and poor after-service is so often a righteous grievance of the machine buyer that it is refreshing to find that Don Watson & Co., maintain an efficient repairing staff and stock a comprehensive range of spare parts so that they can give prompt repair service in connection with Union Machines. This is to be borne in mind when installing high speed sewing machines in particular, as idle machines mean serious loss of production.

DIESEL ENGINES FOR INDUSTRIAL PURPOSES.

High speed machinery is used in nearly every line. Modern centrifugal pumps, cutters, saws, dynamos and innumerable other machines work at 1000 up to several thousand revolutions per minute. Electric motors of small capacity run generally at a speed between 1000 and 3000 revs. p. m.

In order to be able to offer to the small mill owner, workshop proprietor, agriculturist and others an engine which combines the simplicity and compactness of the electric motor with the economy and independability of the Diesel engine, Messrs. Deutz put in the market their well known MAH type engines.

These makers of internal combustion engines started manufacturing as early as 1864. Their first atmospheric engine in 1862, their first 4-stroke (Otto cycle) engine in 1876, their first Diesel engine in 1896, their first airless injection engine in 1911 and their famous multi-cylinder vertical Diesel engine and Diesel vehicle engines in modern times have aroused world wide attention. Engineers like Daimler, Maybach, Benz have gathered their first experience in the Deutz Works.

Industrial development in nearly every country has created the need for a cheap and reliable prime mover of small capacity easily to be handled by a layman. Messrs Deutz have carefully studied all markets and collected the opinion of their engineers at home and abroad, before they designed and started to make their MAH type engine about five years ago.

A small modern Diesel engine must be easily started without requiring much attention, skill or special preparations. The blow lamp for heating the hot bulb of semi Diesel engines is a by far too complicated and frequently disabled device to secure safe starting. A small engine which does not give good service is a constant source of trouble to its owner, and may finally lead to his ruin. Even a small Diesel engine must be designed in such a way so that it may run a good number of hours without requiring attention, refilling of fuel and lubricating oil, or any adjustment. Dust and dirt are the main enemies of the internal parts of a Diesel engine and they must be efficiently kept out. This means the engine must be of the entirely enclosed type, it must be equipped with filters for air and lubricating oil as well as for fuel. A totally enclosed engine must have large covers for dismantling and cleaning all moving parts of the engine. All these requirements have been carefully considered, and the Deutz MAH engines have given such excellent results in spite of their relatively high speed because they are so carefully designed, made of the best material available, and because every part is easily accessible, easily controlled and adjusted.

The bearings in a high speed engine of small capacity should be roller bearings because they require little attention, stand well against wear and tear and are replaced without difficulty by a layman if need be.

The lubricating system must work automatically and all complicated devices must be avoided. The device adopted by Messrs. Deutz i.e. the small ball valve plunger pump with eccentric drive possesses only a few parts and will run with the utmost reliability for many years without requiring any attention. The ball valve is protected by a strainer against being kept open by dirt particles or metal shavings.

A small Diesel engine should be most suitable for all fuels sold in the market, and Deutz MAH engine runs as well on heavy crude oil as on nearly every vegetable oil. The independability from the quality of fuel has been achieved by a special pre-combustion chamber developed by Messrs. Deutz. The chamber is connected with a combustion room by 2 or 3 straight holes of about $\frac{1}{2}$ " diameter, through which the hot air

rushes in when the piston moves towards the upper dead centre during the compression stroke. Against this on-rush of hot air fuel is finally dispersed at a relatively low pressure through a single bore nozzle with only one straight hole. The compression pressure selected for this engine is sufficiently high to ignite any kind of fuel even after the piston has got somewhat worn. Since only a relatively low injection pressure is required for the engine the fuel pump is exceedingly simple, and the speed with which the fuel is sprayed in is relatively low allowing to keep the nozzle hole rather big. Such a nozzle is unlikely to choke and is easily kept clean.

Like the crank shaft, also the timing shaft is accommodated in two ball bearings and serves as a timing shaft for the inlet and exhaust valves. The governor is of the centrifugal ball type and acts on a small overflow valve with eccentric slide valve. The main spring is pressed against the upper governor bowl by means of a screw cap. This screw cap serves also as a speed changing device by which the speed of the engine can be varied while the engine is running.

The water jacket of the cylinder is supplemented by a cooling hopper of sufficient capacity to keep the engine running for several hours after the water supply has been interrupted or the water circulation been stopped.

The starting of the engine is facilitated by a device which keeps the exhaust valve open and shuts off the fuel pump. The handle of this device is kept in the left hand while by the right arm the engine is revolved using the starting crank handle. After two or three revolutions the engine has gained sufficient speed, the handle kept in the left hand is dropped, and the first fuel injection takes place against full compres-

sion. This ensures an immediate ignition of the engine which starts speeding up disengaging automatically the crank handle.

No engine will be properly kept if it cannot be easily dismantled and cleaned. The MAH type engine has a large cover all over the small side of the crank case allowing to dismantle the big end bearing and to pull out the piston without being obliged to take off the cylinder head. Within a few minutes the engine can be entirely dismantled and re-assembled without requiring previous mechanical training, and it can be easily reassembled by every layman.

A testing device for the fuel pump is supplied by which the working of this most delicate part of the engine is easily controlled. Also the spray valve can easily be tested in order to make sure that it gives a proper whitish fuel spray and does not leak. After a few years running the cylinder liner may be exchanged without difficulties.

An engine which is designed according to the above principles is an ideal engine for everybody who requires a prime mover of small capacity, and who has never handled any such machines before. Since its mechanical efficiency is high owing to the application of best material, ball bearings and worm wheel drive, and since the fuel injection system is the most perfect one, the fuel consumption is unrivalledly low and the lubricating oil consumption is almost negligible.

No wonder that more than 50000 engines of this type have been manufactured and sold by Messrs. Deutz in nearly every market of the world and day by day a large number of these engines leave their factory in Cologne. The agents in India for Deutz engines are Messrs Siemens (India) Ltd. 4, Lyons Range, Calcutta.

REVIEW OF BOOKS

REVIEW OF WORLD TRADE, 1933. Published by League of Nations, Geneva. Pages 82, price 2 50 Sw. frs. or 2 sh. 6d.

This is one of the most important among the economic and financial publications by the League of Nations. This annual has already established a name of its own on account of the wealth of facts and figures contained therein. The present volume after careful analysis of the figures of trade all over the world during 1933 arrives at the conclusion that the fall in the quantum of international trade, which set in with the economic depression nearly five years ago, was arrested in 1933 when a slight increase in that quantum occurred. The value of world trade was, however, lower than in 1932, by 10% in terms of gold and by 5% in terms of sterling.

The increase in trade activities was almost entirely due to raw materials, the quantum of which entering into trade is estimated to have risen from 1932 to 1933, by as much as 8%. The corresponding increase for manufactured articles is less than 2% and the quantum of foodstuffs traded is estimated to have been 8% less than in 1932, owing largely to increased self-sufficiency in several of the main consuming countries.

The figures of imports and exports of individual countries given in the book should prove a useful source of reference to students of trade problems.

THE STORY OF PETROL by C. Webber, M. A. (Oxon). Published by Thomas Nelson & Sons, Ltd., 35-36, Paternoster Row, London E. C. 4. Pages 217, Price 3s. 6d.

Coal was for long a tremendous power in the hands of its owners. It heralded the advent of the industrial renaissance which brought about a revolution in the economic outlook of the nations. If it was a vital weapon on land and sea, it has now met a serious rival in the mineral oil which is found to be a decisive weapon on land, sea and air alike. It may be unknown to many that oil and oil products ranked among the principal agents by which the Allies could conduct and win the Great War. When the Allies were close to a naval oil shortage in 1917 due to the German submarine campaign against the sea train of tankers, Premier Clemenceau in an appeal to President Wilson for American petroleum wrote, "Oil is as necessary as blood in the battles of to-morrow." After the War was won, Lord Curzon told the story how "the

Allies floated to victory on a wave of oil." Hence when the peace conference came, there was a regular fight of the victors over the oil spoils. It was generally apprehended that he who owned the oil would own the world, for he would rule the sea by means of heavy oils, the air by means of the ultra refined oils, and the land by means of petrol and the illuminating oils. And in addition to these he would rule his fellowmen in an economic sense by reason of the wealth he would derive from oil.

The story of the petrol is therefore bound to be a fascinating subject especially in this age of oil. What it is, how it came to be formed in the abyss of the earth, how it is mined, the marvels it is capable of accomplishing are subjects which awaken the curiosity of all. And it is exactly to supply information on this interesting subject that the book has been written. There are vivid descriptions of the excitements in the oil-fields, of the transport of the oil by pipe lines and tankers and the working of the oil engines in aeroplanes, ships, rail cars and motor cars. Coming from the pen of one in constant touch with the petroleum industry the book covers a wide variety of experience and information. The book will make an ideal prize book for boys. Even adults intending to have some knowledge about the working of the petroleum refining and its wide potentialities will be amply repaid by the perusal of the book.

INDUSTRIAL POLICY OF INDIA with Special Reference to Customs Tariff by C. N. Vakil and M. C. Munshi. Published by Longmans Green & Co. Ltd., 6, Old Court House Street, Calcutta. Page 266, price Rs. 5.

When the advanced countries of the world are deeply engaged, in the wake of the Soviet Union, to consider the ways and means of industrial and economic planning on a wide scale, it is far more important for India to have an industrial policy of her own which will further her national interests. It requires no mention that a sound industrial policy alone has spelt prosperity to the ruling nations and that no country can aspire to grow industrially without it. Customs tariffs also wield a great influence on the industrial prospects of the country and can shut out or encourage certain imports and exports, by imposing or withdrawing barriers for promoting the trade and industries of the country. Hence in a study of the industrial policy of India, the principles underlying the imposition or regulation of

customs tariffs cannot be ignored at all. The authors of the present volume are therefore to be congratulated upon making a comprehensive and critical study of the future industrial policy of India in relation to the customs tariff.

The volume opens with an historical survey of the past and present industrial policy in India, which is as interesting as it is informative. The operations under the present scheme of discriminating protection have been critically discussed; and how the question of Imperial Preference was gradually imported in tariff enquiries and the Ottawa Agreement was arrived at have been explained at large.

In the opinion of the authors the goal of an industrial policy for India should be the maximum protection with a national outlook. The policy should be comprehensive and embrace all possible industries large and small, existing and potential, for which a reasonable field is available. The policy of discriminating protection afforded to certain industries under certain conditions is therefore found wanting on the basis of the definition of the goal of the Indian industrial policy. The question of granting Imperial Preference and commercial treaties has now assumed a large proportion and has rightly been treated at considerable length in the book. The authors urge that an attempt for the only political consideration of strengthening the political unit known as the British Empire by an artificial bond of economic nature is both unsound and uneconomic and cannot but possess a baneful influence on the weak and undeveloped contracting parties now on the way to advance industrially. After full examination the authors come to the conclusion that it is economically more advantageous for India to work on the strictly economic lines of Commercial Treaties, instead of thinking in political terms of Imperial Preference which obviously confuses political issues and aims at economic considerations. The authors also explain the implications of the commercial safeguards envisaged by the White Paper and how they are likely to affect the larger interest of India. The major part of the book is however devoted to the analysis of the tariff methods as in practice in India and in other countries. The authors not only bring home the defects obtaining in the present schedule of tariff rates but also have taken considerable pains in suggesting a fresh tariff schedule on the basis of the industrial policy as laid down in the book.

There is a growing impression among a number of scientific writers and essayists that there have been far-reaching revolutions in science and that, at least, to a very grave extent, the most confident teachings of the last century have had to be abandoned. They would put it that the materialistic science of the last century was dominated by three great theories—the nebular hypothesis in astronomy, Darwinism in biology and atomism in physics—and all three are now dead and that their place has been occupied by the principle of relativity. Mr. McCabe, in the present volume, champions the cause of the mechanical conceptions of science which are sought to be disparaged by scientific popularisers like Sir A. Eddington, Sir James Jeans and Prof. Whitehead and shows by an able survey of the past and present investigations that in eighteen out of the twenty main branches of science, no new discovery that can be called revolutionary in character has been made. It is only in physics and astronomy that there have recently been some outstanding contributions in the shape of atomic theory or the theory of the expanding universe or of a sub-atomic source of stellar energy but then these can hardly be pronounced to be of a revolutionary type and altering the truths of the old science. Mr. McCabe has attempted in this book to remove the loose popular misrepresentations about the mechanical or materialistic philosophy of the last century and attributes this to an engrained mystic belief among the scientists of modern school of thought that what we call material things are only ideas in the mind of God. He has examined the latest researches about origin of man, evolution of mind, human mechanism, nature of life, evolution of life, etc. and comes to the conclusion that the truths opened by the "new discoveries" have without reserve proved and strengthened the most radical and revolutionary claim that "the materialistic science" of the last century ever made. People with an interest in the speculations about the fundamental teachings of science of the last and present century will find the book an excellent treat.

A RECOVERY PLAN FOR BENGAL by S. C. Mitter, B. Sc. (London), M. L. C. Published by the Book Company, Ltd, College Square, Calcutta. Pages 699.

Bengal in the grip of severe economic depression and wasteful unemployment stood in need of a recovery plan that would bring food to the homes of the Bengali peasants, artisans and unemployed youths alike. Her agriculture did not bring adequate return to the cultivators; her industries were greatly disorganised and

THE RIDDLE OF THE UNIVERSE TODAY by Joseph McCabe. Published by Watts & Co., 5 & 6, Johnson's Court, Fleet Street, London, E. C. 4. Pages 250, price 5 sh.

Lubricator.

We are glad to receive from Messrs Shunker Das & Co., "Camera House," The Mall, Lahore a lubricator manufactured by them. The apparatus gives good service and is no way inferior to the of foreign make

A Commercial Directory.

We have received a copy of Commercial Directory for 1934 of the Gwalior State written in Hindi language. The book contains many useful information relating to minerals and other materials found within the State. It may be obtained from the Supdt. Statistics, Gwalior State, Moti Mahal, Gwalior.

Trade Enquiries.

(To communicate with any party write to him direct with name and address given below mentioning Industry).

2998 M. J. Chocolatewala, 87, Waroda Road, Bandra—Wants to invest Rs. 2000 in any good business. Full particulars of the business may be submitted.

3020 B. K. Mukherjee & Co, 94, Baradeo, Benares City—Want to be put in touch with importers of mountain and jungle products such as gorachan, khush, biroja, etc.

3055 The Oriental Commercial Bureau, Cochin—Wants to be put in touch with firms dealing in cast iron pans, stoves, railings and gates, galvanised buckets, Japanese playing cards, clocks, wire nails and glass bottles preferably in Bombay and Calcutta.

3070 Parmanand Asudaram, Bombay Bazar, Karachi—Wants to be put in touch with the merchants interested in printed chadars, pillow covers, etc.

3116 C. Gurnatha Chetty, Anthiyur, Vairode—Can supply porcupine quill and elephant tusks.

3138 Pandit Shivji Bhut Wali, 3rd. Bridge, Srinagar, Kashmir—Wants to be put in touch with the suppliers of seeds of hooka tobacco.

3225 J. A. Karachiwala, 174, Samuel Street, Bombay, 3—Wants to be put in touch with the parties interested in fish oil, zinc oxide, and water soluble colour.

3229 M. R. Karkera, Managalore—Wants to be put in touch with the parties in Calcutta interested in fish oil, and firms in Karachi interested in divi coir yarn.

3297 R. N. Sharma, Pilani, Jaipur State—Wants to be put in touch with the dealers in must raw hides and skins, babul jhari and janti bark and suppliers of handspun woollen yarn.

3292 Bhoglal Keshavlal, Morvi—Wants to be put in touch with suppliers of cardamom, pepper, spices, ginger, betelnuts, forest and

vegetable produce, raw drugs and chemicals, perfumery raw materials, attar, essences, hingy catechu snuff, tobacco, cigar and printed series etc.

3297 F. F. Gonsalve, Eravipuram, Mayyanad, Travancore—Wants to be put in touch with the suppliers of buffalo or bison horn, Paddi birdo

FEBRUARY ISSUE OF INDUSTRY.

(In the Press.)

February issue of Industry which will be published on the first day of the month will contain articles on Manufacture of Gramophone Records and Chrome Leather Manufacture in addition to the usual features such as Small Trades and Recipes; Formulas, Processes and Answers; Reader's Business Problem; Brief Queries and Replies. Any friend of our subscribers will get a copy free as sample on application to the Manager, Industry Office, Shambazar, Calcutta.

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Subscription money is always payable in advance or by V. P. P. The foreign subscription should be sent by B. P. O.

At the time of sending a V. P. P. only the current number is generally sent. The previous issues of the volume are sent per bookpost on receipt of the value of the V. P. P.

NOTICE TO ADVERTISERS

All charges for advertisement from old and new parties are strictly payable in advance and no request for realisation by V. P. P. is entertained unless substantial deposit is previously made.

Contract especially as regards position is not valid unless confirmed by us in writing and accompanied by cash in sufficient time. Advertisement when published in other places than ordered for is payable at the rate scheduled for that position.

Ordinarily advertisement forms close on 20th of the month and all copies and remittances must reach this office at least two days before the date, and for special issues, 10 days before that, unless otherwise notified.

For rates and other particulars write to:—
Manager, INDUSTRY OFFICE,
22, R. G. Kar Road, Shambazar, Calcutta.
Phone B.B. 3858.

INDUSTRY

THE MAGAZINE FOR MANUFACTURERS & BUSINESSMEN.

VOL. XXV.

CALCUTTA, FEBRUARY, 1935.

NO. 299.

FACING FRESH FETTERS.

OTTAWA Pact proved no benefit to Indian industries. Yet Governments of England and India felt the necessity of fresh safeguards for British manufactures.

A new trade agreement entered into by the two Governments, supplementary to the Ottawa Pact, provides to "equate the prices of imported goods to fair selling prices of similar goods produced in India" and allows full opportunity to any British industry concerned to state and defend its case before the Indian Tariff Board whenever a substantive protection to any Indian industry is considered or any "radical changes" are effected in the condition affecting a protected industry.

Our industrialists and traders have raised a cry of despair. They find themselves enveloped in darkness without any silver lining whenever any measure threatens their expediency.

Is it only quality consideration or price consideration that enables an industry to grow? There indeed are other factors which should not be overlooked. First there should be market research to study the actual requirement of the customers.

Secondly there should be intensive internal organisation and study for reduction of cost of production.

Thirdly there must be training of salesmen and extensive combined propaganda for popularising an Indian product.

And fourthly there should be in every wholesale market a co-ordination between producers and retailers on the basis of promotion of mutual interest.

Indians have low establishment cost on their side. They can combine for better production and study methods of lower cost. They can bring the retailers and merchants together for inaugurating better credit. They can find and create new customers by studying better selling methods.

Need we have a fuss at every retarding step or should we find out better way of progress?

How Gramophone Records Are Made.

WHEN the gramophone is working, the finished record is placed upon the revolving turntable of the machine, and the lower point of a needle is placed in a groove engraved or pressed upon the surface of the record. This groove contains tiny projections which cause the needle to vibrate as the record revolves. The upper end of the needle is attached to a thin sheet of mica or other similar material and the vibrations of the needle also cause this sheet known as the Diaphragm to vibrate, and these vibrations are then intensified or amplified through the sound or tone chamber of the machine. These vibrations then cause sound waves which likewise cause the diaphragm in the ear of the hearer to vibrate, and the person hears a reproduction of the tones or sounds from which the record was originally made.

The loudness of the sound may be regulated by using needles of different length and thickness; if a short needle is used, the needle arm of the lever is shortened, and the amplitude of movement of the centre of the mica disc is increased, and this creates louder sound waves. The loudness is also increased by the fact that the short needles are also thicker, and therefore more stiff; they follow the waves of the record with less bending, and so set up in the diaphragm vibrations of greater amplitude.

The discs or records, have the appearance of vulcanite; but they are really made from a mixture of shellac, shredded rags, tripolipowder (or

rotten stone), sulphate of barium, and lamp black. These ingredients are intimately ground together, and passed between heated rollers, thus forming the smooth black plates which, when cold, are very hard.

Let us begin with the various operations necessary for the production of finished records.

In the production of gramophone records there are relatively few manufacturing processes, but there are some conditions in connection with this industry which are somewhat troublesome to person possessing only theoretical knowledge of the subject.

A plant manufacturing gramophone records consists of three principal departments as follows: (1) The recording, (2) the electroplating, and (3) the production of finished record.

RECORDING THE SOUND.

The recording department is indispensable for recording sound. The product turned out by this department is the recorded wax. The process of producing this wax or disc is as follows: The blank wax upon which the instrumental or vocal sounds or tones are to be recorded is compounded or prepared chiefly from paraffin and beeswax together with some other chemicals. Sometimes this wax is made of a mixture of ozokertie 2 parts and paraffin wax 1 part or of a soap composed of stearic acid, caustic soda, and aluminium hydrate mixed with ceresine or japan wax. These materials are cooked or heated and then the resulting mixture is poured into cylindrical moulds and

allowed to cool. Then this hardened wax is removed from the mould and one side of it upon which the recording is to be made is shaved until it is perfectly smooth. These discs are usually from 12 to 14 inches in diameter, and from 1½ to 3 inches in thickness. They are then ready for use on the recording machine.

Now in the making of the recording of sound the blank wax described above is first of all dusted to remove every particle of foreign matter and placed upon the turntable of the recording machine and the lower point of the needle is placed in operation while the sounds or tones which it is desired to record are directed into the sound or tone chamber of the machine. The sound waves caused by the instrument or voice tones are transmitted to the diaphragm of the machine causing this diaphragm to vibrate and in turn these vibrations are transmitted to the upper point of the needle attached to the diaphragm. The lower point of the needle then carves a groove upon the blank wax and the edges or bottom of this groove will contain tiny projections caused by the vibration of the needle. The needle is guided so that a continuous spiral groove is made round and round the wax as it revolves. As a rule the needle is started on the outer edge of the wax and travels towards the centre. This completes the work of the recording department, although usually two recorded waxes are made of each recording, since these waxes are easily spoiled, thus affording a protection against the complete loss of the recording through the damaging of one recorded wax.

After these waxes are recorded, they are carefully packed and transferred to the electroplating department.

ELECTROPLATING DEPARTMENT.

In this department the recorded wax is chemically treated by plunging it into the electrotyping bath which deposits on its surface a copper coating that enters into every twist and wriggle made by the recording needle within the grooves. These, of course, represent the sound waves passed on by the vibrations of the diaphragm. When this coating is sufficiently thick it is removed and brings with it the exact impression of the wax reversed. Only one shell can be secured for each wax as the grooves of the wax are damaged in removing the first shell. This metal shell is called the Master Plate, and is a negative of the wax since what were grooves on the wax become ridges or projections on the master plate. This plate must be handled very carefully since a slight blow or pressure upon its surface would be very likely to damage the ridges or projection on it.

The master plate is now chemically treated as before and then nickel-plated. Because of the treatment before plating, the new shell is easily removed. This shell or plate is a duplicate of the original wax and is called the Mother Plate. As a rule two or more mother plates may be made from one master plate. In a similar manner another shell is made from each mother plate. These last shells or plates are called Pressing Matrices, as they are used as dies in producing the finished record.

It will be seen that these pressing matrices are a negative of the finished

record and of the recorded wax, since what were grooves on the mother plate become ridges on this plate. The pressing matrix shell is then cemented on a copper plate or back to make it more substantial and capable of having force or weight applied to it without danger of bending or perforating the shell.

The pressing matrix is the finished product of this department, as the master and mother shells are simply intermediate steps between the recorded wax and the finished pressing matrix.

RECORD DEPARTMENT.

The finished pressing matrices obtained in the previous operation are ready for use in the record department. This department is usually divided into five sections, namely stock preparing section, record pressing, record inspection, record edging, and finishing record.

In the stock preparing section the various materials used in making the stock, of which the finished record consists, are ground, pulverised and then mixed together according to carefully guarded formulas. Many believed that the discs, with their beautifully polished surfaces, were made of vulcanite, but these are not really made of it the actual ingredients that come into the composition are shellac, the mineral barytes, rotten stone, flock (made from rags) and lamp-black, the percentage of which are not known as different companies use these components in varying quantities. So that the exact proportion depends upon the quality of the goods it is intended to produce and is to be determined by experiment. The process of manufacture may be indicated briefly. The ingredi-

ents are ground together and after being mixed is then cooked and kneaded between steam heated rollers. Then it is fed through a blanking machine which rolls it out into a thin layer and cuts it into squares or blanks about $\frac{1}{4}$ of an inch thick and 8 inches square. These blanks are then placed on tables or racks and cooled. They are then ready for use in the record pressing department.

In the pressing department, the pressing matrices are received from the electroplating department. Each matrix contains the imprint for one face or side of the finished record. Therefore to produce an ordinary double faced record two pressing matrices are used. The record is produced on a machine known as a record press. This machine is like a vise in principle, there being two jaws or heads which are opened and closed by the use of hydraulic power usually. In the manufacture of a record the jaws of the press are opened and a pressing matrix is clamped on the lower side of the upper jaw, and another on the upper side of the lower jaw. Next a blank of record stock are produced in the stock. Preparing department is placed on a steam table and heated until it becomes soft and pliable. Then this blank is placed on the centre of the pressing matrix clamped to the lower jaw of the press. A record label is next placed on each side of this record stock and the jaws of the press are forced together which flattens the record stock out between the two pressing matrices. Then steam is circulated around through the jaws of the press which heats the record stock so that the impression of the two matrices is made on the stock. After

the jaws have been closed for a short time, probably a half minute, the steam is shut off and cold water circulates through the jaws of the press cooling the plates and the record. When they are thoroughly cooled, which likewise may take a half minute, the jaws are released and the labelled record lies upon the lower plate or it may sometimes adhere to the upper plate, but is usually removed easily if the press is properly operated and the plates properly installed. The record is then placed in a container and the workman proceeds with the making of another record.

The records having been obtained are examined for imperfections. For this purpose many of them are actually played on a gramophone to detect imperfections which might not be visible to the naked eye. In this way many imperfect and damaged records are thrown out. These defective records are again ground and pulverised for the preparation of record blanks or squares in the manner already described.

The accepted records are next clamped to the revolving spindle of a lathe and their edges are made smooth with sand paper or emery blocks, thus completing the production of the finished record. After this operation the finished records are placed in individual pockets or envelopes ready for market.

Contributions are invited from our readers on industrial and technical subjects. The articles should deal with the practical side of the industry and may be suitably illustrated.

Articles not suitable for publication are not returned to the writer unless these are accompanied with sufficient postage stamp.

CHROME LEATHER MANUFACTURE.

THE manufacture of leather by the action on pelt of mineral salts, has in recent years developed to such an enormous extent that the permanency of many of the time-honoured vegetable processes is now a matter of considerable doubt. Although the alum-dressed leathers have been known for some centuries, and have represented the possibility of mineral tannages, their commercial importance is now small when compared with the more recently introduced "chrome leather", hence in this article the latter method is dealt with somewhat exhaustively.

The action of chromium salts, on hide was first studied by Knapp, who concluded that their action could not be made of any practical value. Somewhat later Cavallin took out a patent for treating skins first with potassium dichromate, which was afterwards reduced to ferrous sulphate; but the process did not produce a satisfactory article. Heinzerling, in 1879, patented a process for making chrome leather in which the skins were treated with alum and potassium dichromate, the latter being reduced at the expense of the hide fibre and fats employed in currying.

This process, again, attracted little attention, and it was left to the ingenuity of Schultz to bring out an idea, commercially valuable. In this process the skins were treated first with a solution of chromic acid made by the action of hydrochloric acid on potassium dichromate, and afterwards with a solution of sodium thiosulphate and acid, thereby causing the reduction of the chromic acid to a

basic chromic salt, which produced the tannage.

The nature of the mineral tannages has been the subject of much discussion and research; but it is becoming increasingly recognised that there is a considerable resemblance in fundamental principle to the vegetable tannages. For the production of a permanent leather "it is not only necessary to dry the fibres in a separate and non-adherent condition, but so to coat them or alter their chemical character that they are no longer capable of being swelled or rendered sticky by water. In the vegetable tannages the astringent tannin, presented to the hide fibres in colloidal solution, are absorbed by them and cause the contraction and separation of the fibres which is the first requisite for leather production. The colloids thus precipitated then undergo a further change in their chemical character, the nature of which is not yet completely understood, but which may involve oxidation, dehydration or polymerisation, and which at any rate is irreversible, giving rise to a product that will not swell or dissolve in water. Many mineral salts, especially when used in conjunction with a certain amount of free acid, will also fulfil the first condition necessary for the production of leather, viz., the isolation and dehydration of the fibres but will not permanently fix themselves in the fibres and cause these to lose their capacity for absorbing water. This second condition can be realised, however, when the salts yield solutions in which hydrolysis has taken place into free acid and colloiddally dissolved basic salt or hydrate. When such solutions are presented to skin, the free

acid quickly penetrates and is absorbed, but reversibly, i.e., it can be removed by washing or neutralisation, whereas the colloidal basic salt penetrates more slowly but is absorbed irreversibly. Such solutions are obtained from the salts of trivalent iron, chromium and aluminium. The normal salts of these metals are all hydrolysed more or less in this way, but unless made "basic" by the neutralisation of some of the free acid they are only to a very small extent capable of this permanent fixation. This is well illustrated in the long-known alum tannage in which the leather is easily wetted back and much of the alum removed by washing. When made basic, however, the salts of all these metals are capable of making leather, though its quality is much influenced by the nature of the acid radicle and the degree of basicity. With the common salts of chromium there is a much wider range of basicity permitting the production of a satisfactory leather, than in the cases of the salts of aluminium and iron, and this fact accounts to a large extent for the commercial success which has attended the use of the former.

Let us now proceed with the various operations step by step.

PRELIMINARY OPERATIONS.

The skins are first soaked in plenty of clean water; the time varies according to the condition of the skins, but about two or three days should be sufficient to bring them back to a good soft condition. This is greatly facilitated by the addition of a little borax or soda to the soak liquors, about one pound of borax per three hundred gallons being considered sufficient for the purpose.

Sulphide of sodium is also used for the same purpose, and has a decided effect on softening the hard nature of the skins and getting them into condition for liming. Care should, of course, be taken that putrefaction does not set in, and this may be guarded against by changing the first water after about twenty-four hours, and after drawing the skins, to put them into the second soak treated with some disinfectant.

If the skins are very hard and dirty, a "breaking over" between the changes of water is beneficial. This breaking over is done in small tanneries by well stretching and working the wet skin with a blunt tanner's knife over the half-round beam.

LIMING AND UNHAIRING.

In the manufacture of glace goat, lime and arsenic sulphide are the materials generally favoured for depilation. Experience has shown that the action of lime loosens the hair, distends the fibres of the skin, assists to neutralize the neutral fat, and so far acts upon other constituents not necessary to leather-making that they may be mechanically worked out later. In practice it is common to add about 5 lbs. of "red arsenic" to about 100 lbs. of lime slacked in a large tub. The lime should be thoroughly slaked with enough water to moisten it, and the arsenic added and mixed thoroughly with the lime, and the whole mass well stirred. A minor objection is that sulphuretted hydrogen is evolved during the process, so that it should be carried out in the open air, if possible. The arsenic helps to shorten the time of the depilating process, whilst it also

greatly assists in producing leather of a supple texture and a smooth grain.

When the above quantities of lime and arsenic are dissolved the solution is thrown into the pit with sufficient water, care being taken that no undissolved particles or stones find their way in. No hard and fast rule can be laid down, but the quantities stated are sufficient to unhair from five hundred to six hundred skins. After the skins have laid in the solution for a day or so they are hauled up and laid up to rain, the solution being well plunged up before the skins are re-entered. It may be also necessary to strengthen it by the addition of a little more lime and arsenic after a day or two, but a good deal depends upon whether old or new liquors were used at the start; generally speaking, it is inadvisable to use much lime towards the end of the process, as it has a tendency to produce a coarse grain on the finished leather.

In some factories it is considered safe to start with a liquor showing about 3° Twaddle, and finishing up with one at about 5° or 6°. The time taken for depilation varies, but may be approximately put at from ten to fourteen days, a good deal depending upon the condition of the skins, the temperature of the solution, and the handling of the goods received.

When the skins have had enough lime they are usually washed in water to cleanse them as far as possible, and if the shanks, etc. have not been removed before, they are trimmed away when the skins are ready for unhairing.

The unhairing, being a very simple operation, is often done by hand on the

half-round tanner's beam with a blunt knife; of late years, however, this operation has been done by machine. The only drawback to the use of the machine for unhairing is that the holey and defective skins are rather harshly treated, and if great care is not used a skin is often so torn by the action of the spiral knives that it is practically worthless.

In nearly all large chrome leather works goat skins are fleshed by machine. The operation is, however, comparatively simple, and in countries where there is an abundant supply of cheap labour, it is easy to train men to flesh goat skins in the old-fashioned way with the ordinary tanner's knife. Goat skins, as a rule, are not very fleshy, and most of the loose tissue can be removed by the "brushing" or scraping the edge.

In no case should fleshing be entrusted to any but a most intelligent man, who should be encouraged by good wages to become a thorough master of the operation.

To ensure the production of a good tough and elastic leather with a fine "break" and grain, it is necessary to pay special attention to this process. If lime be present in the skins when they go to the chrome bath, it is turned into sulphate of lime, and the leather is hard and often brittle.

After fleshing, the skins are trimmed where necessary, and well washed in plenty of soft water to remove as much lime as possible, and, after draining, are ready for the puring operation. All sorts of de-liming agents have been tried, such as sulphuric and lactic acids etc. but experience has shown that in the majority of cases the old and dis-

agreeable excrement pure gives the best results.

Space, however, will not admit of enlarging upon the various de-liming agents which have been tried, and as dog-dung is by many still regarded as the best material for glaze goat, we will devote our limited space to a consideration of its use. In puring it is necessary to remove, the dissolved gelatinous substance, the hair sheaths, fat glands, etc. and the lime soap produced by the action of the lime on the natural fat of the skin.

For the heavier kinds of hides and skins, hen and pigeon dung is used for bateing, but dog-dung is almost exclusively obtained from dog-kennels, and as it varies in strength and characteristics, it is difficult to give any definite directions for its use. As dog-dung rapidly ferments it should not be exposed much to the air. In many works it is mixed with a little water to a paste, and kept in this way, and in no case should the dung be used until it has been allowed to ferment for six or seven days. In practice a few pails of the semi-liquid dung is added to water at a temperature of about 90° Fahr., the dung being first strained through a coarse bag to remove bits of bone, gravel, and other sediment. The skins soon begin to "fall" in the solution, or lose their plumpness, and are considered to be sufficiently pured when the grain retains the impression of the thumb or fingers.

SCUDDING.

After the skins have been pured, drenched, or both, as the case may be, they then carefully worked over on the grain side to remove the lime-soap, pig-

ment, fat, short hairs, and other matter. This is also a very necessary operation, as if much "scud" is left in the skins, the leather on finishing refuses to glaze properly, whilst any hairs remaining would quite spoil the look of the finished article.

In some places the scudding is still done on the tanner's beam with the half-round slate "knife," the workman thoroughly extending and working out the soft and flaccid skin in every direction. It is usual now, however, to do this operation by a machine similar to that described in fleshing, the skin being subjected to the action of a cylinder into which slate tools are let in, the bolster being of stout rubber. The work is done fairly well and very cheaply; but it is a good rule to have the skins examined and to rectify any faults by hand on the beam.

CHROMING OPERATIONS.

No two glaze goat makers follow quite the same procedure, and whilst some see an advantage in giving the skins a pickle of acid and salt before proceeding to the actual chrome tanning, others dispense with this process as unnecessary. If the former process is done, however, one American authority says that 10 lbs. of salt for each 100 lbs. of drained pelt, dissolved in 15 gallons of water, is sufficient. The skins are run in a drum with this solution for about fifteen minutes, and the acid given. This is prepared by mixing 2 lbs. of muriatic acid (hydrochloric) in a pail of boiling water and cooled with two pails of cold water. This is added to the skins in the drum, which are run for another

fifteen minutes, when the skins are ready for the chrome bath.

The saturation of the lighter pelts, such as calf and goat, with the chromic acid is invariably carried out in the paddle or drum. Care should be taken to see that the driving arrangements are always in good order, as a breakdown often involves serious trouble and loss.

The chrome bath is prepared by dissolving bichromate of potash in boiling water which is acidified with hydrochloric acid, and this is added to the goods whilst they are running in a suitable quantity of water. The quantity of bichromate of potash is calculated on the weight of the wet drained skins, and varies from 4 to 6 lbs. per cent. In practice, about 15 gallons of water to 100 lbs. of skins is recommended. The amount of bichromate of potash is not very material, but from 5 to 6 lbs. per cent. of wet pelt is a safe margin. One method is to dissolve 6 lbs. of bichromate of potash in 20 gallons of water, to which is carefully added 3 lbs. of acid. Some authorities also advise the addition of a few pounds of salt to the solution, but of this the writer has had no experience. In practice it is advisable to dissolve the bichromate of potash in a suitable quantity of hot water, and add the solution to the goods whilst in motion in the drum or paddle, the requisite amount of acid being added in successive stages.

The skins are padded in the acidified liquor until they assume a yellow colour throughout, the process being finished when a cut in the thickest part of the skin shows complete penetration. When completely struck through, the skins are

taken out of the acid solution, horsed up carefully, care being taken to avoid light and wrinkles, and the excess of liquor struck out by machine. The next process, technically called "reducing," is the reduction of the chromic acid. In many works the skins are first dipped one by one into a weak solution composed of about 4 or 5 lbs. of hyposulphite of soda dissolved in 15 gallons of water; this is sufficient for 100 lbs. of wet pelt. This dipping process is assumed to somewhat "set" the grain side of the leather, and so prevent the tendency of wrinkling or coarseness caused by the sharp action of the reducing bath. This latter is usually done in paddles; 10 lbs. of hyposulphite of soda being dissolved in 20 gallons of water and added to the proper amount of water in the paddle. Five per cent. of muriatic acid, calculated on the wet weight of the skins, is then added, and the skins paddled in this until they lose their original yellow colour and assume a bluish-green tint throughout. It is a good plan in practice to so arrange the work that the chroming begins in the morning and is completed in the evening. It is of the greatest importance that the reduction should be complete, as no amount of work in the subsequent stages will ever make a first-rate article. It is also an advantage if the skins are sorted into various substances before chroming, otherwise the penetration is uneven throughout the pack, and the heavy skins may be under-tanned. It might also be mentioned that the reduction should be done in a well-ventilated room, as the fumes given off during the process are both disagreeable and detrimental to the

health of the workman. When the skins are perfectly chromed throughout they are taken out of the paddle, and are then given a prolonged washing in a weak borax solution, followed by plenty of water. This will neutralise any free acid remaining, and should be continued until no reaction is shown by the leather when tested with litmus paper.

STRIKING-OUT AND SHAVING.

The skins are next well struck out by machine, and passed on to the shaving machine. In the case of goat skins it is often only necessary to level the necks and backs of the skins, although if of stout substance they will require reducing all over. This process must be done with judgment and by careful operators, if damage to the leather is to be avoided. The fact, too, that there is a certain element of danger in working the shaving machine should make the selection of operators worthy of more than ordinary consideration. The cost of machine shaving is not great, and varies from about a penny to three pence per dozen.

DRYING CHROME LEATHER.

If the skins are to be divided into black and coloured work, the sorting must be done at this stage; only the finest and most perfect grain skins are suitable for colouring fancy shades, so that those which are marked, imperfect on the grain, or greasy, should be put for black work. At the same time it must be remembered that the quality of the black skins is obviously deteriorated by sorting the best skins out, so that a good deal of judgment is required.

Economical Uses of Sawdust.

THE quantity of sawdust produced annually in this country is immense, though it is quite impossible to estimate it with any degree of accuracy. Generally, it is correct to reckon 10 to 12 per cent. of the logs sawn is converted to sawdust. This must amount to many thousands of tons, a fair proportion of which is burned off creating a nuisance by means of the smoke in the neighbourhood. It is a matter of considerable importance to find economical uses for this waste product, and this matter has by no means been neglected. Below is set out a list of some of the very many uses for sawdust, collected from various reports. They are classified into (a) Uses as such; (b) Uses in admixture with other materials; and (c) Uses in manufacturing derived products.

USES AS SUCH.

Fuel, insulating material, packing ice, packing fruit, stable bedding, floor absorbents, polishing and annealing metals, addition to clay soils, wood floor, purification of gas, covering concrete, stuffing cushions and dolls, circus rings, filtering, fur dressing, sound proof floors and in tanneries for damping back leather.

USES IN ADMIXTURE WITH OTHER MATERIALS.

Floor sweeping compounds, artificial woods, paving blocks, linoleum, plastics, blasting powders, fire lighters, soap-making, fertiliser filling, wall papers, oatmeal and velvet papers, damp-proof courses, and burning of clay products.

USES IN MANUFACTURE OF DERIVED PRODUCTS.

Distillation, fusion with alkali to yield oxalic acid, acetic acid, formic acid, and methyl alcohol, hydrolysis with acids to manufacture alcohol, in the manufacture of carborandum and carbide, producer gas making, manufacture of viscose, manufacture of cellulose acetate, manufacture of paper and boards, manufacture of pyrotechnics, and manufacture of nitro-cellulose.

USES AS SAWDUST.

Many of these uses are only capable of absorbing small quantities of material. Some of them are industries not developed to any extent at present in India. They are all set out, however, to indicate the great variety of possible uses. In considering these various methods, only those that are likely to consume considerable quantities will be dealt with in any detail, e.g., use as fuel, in manufacture of paper, alcohol, acetic, formic and oxalic acids.

In spite of the fact that many of the uses mentioned only consume small quantities, it should be possible, by organisation, to develop a large business, and so find uses for a large amount of material now wasted. In many American cities, there are several sawdust companies handling this trade. They purchase supplies from the mills scattered about a district and assemble it at a central depot. Here the various grades, such as hardwood or softwood dusts, are kept apart. As a general rule, softwood sawdusts, except pine, are mixed. The

material is further graded according to size, and is sifted in special screens to supply any desired degree of fineness. In this way, the companies can meet the needs of a large number of consumers, with just the variety required, hard or soft, coarse or fine. It is only in this way that it is possible to successfully handle cheap waste such as this. Sawdust companies, by means of their organisations, develop new uses. Care is essential to keep the sawdust clean and dry, and the various types and grades separate. Brief consideration will first be given to some of these minor uses.

INSULATING MATERIAL.

There is an opening for quite a considerable consumption of saw dust for insulating purposes. Large quantities are already used, and if properly applied, it is very satisfactory. The sawdust must be dry and carefully packed. It is very liable to pack very unevenly unless care is taken. Packing of roofs of houses in hot climates is very efficient in keeping down the temperatures. For ice-chests, also, it is very suitable. Closely related to this is use for packing ice for transport.

PACKING OF GOODS IN TRANSIT.

This is one of the very common use for which almost any form of dry dust is suitable and it has many advantages as a packing for all kinds of articles. It packs down and fills all the empty space, and its absorbent qualities make it most suitable for liquids in breakable containers.

POLISHING AND ANNEALING METALS.

Jewellers and others working in metals use sawdust for a variety of purposes. In plating works, after

cleaning the metal in acid baths, it is dried by placing in sawdust, which rapidly absorbs the moisture and keeps the metal from contact with the air and consequent oxidation. The jeweller does the same after cleaning metals. He also polishes jewellery by rolling it in a barrel with sawdust. It is also used in annealing metals and glass, and also to some extent in case hardening.

FUR DRESSING.

Furs are cleaned by tumbling in drums with sawdust which absorbs grease and dust. Sawdust is also used as a cleansing agent in various industries, such as paint works and metal works.

MANURES AND ADDITION TO SOILS.

In manures, the sawdust has no value as a fertilizer, but it is a good absorbent and a useful filler. Its addition to clay soils is to lighten them.

SMOKING FOODS.

Meat, sausages, fish, etc., are smoked to give flavour and to increase the keeping qualities. A smouldering fire of wood and sawdust is used, and the time of this can be cut down by using a higher temperature. Certain varieties of sawdust give the best results.

WOOD FLOUR.

Wood flour is a fine, fluffy, absorbent fibre, made by grinding wood chips or sawdust in a stone mill with a limited amount of water. It is used in linoleum, oatmeal, wall papers, and plastics.

Most of the other uses of sawdust as such are too well known to need elaboration.

FUEL

There remains one use, however, which is of great importance, and which seems to be capable of great extension,

and that is as a fuel. The following remarks apply very largely to waste wood, which can be hogged into small chips as well as to sawdust. Such immense quantities of fuel are used in the industries that its cost forms a very considerable factor in the cost of production. The fuel value of dry wood is about 8,000 B. T. U., as compared with, say, 12,000 B. T. U. for average coal. In many places coal is successfully used with far lower calorific values, say, 10,000 B. T. U. Considering the relative cost of saw dust to that of coal, and the relative calorific value, the former has a great advantage, discounted though this may be by other factors. A tremendous variety of furnaces for burning sawdust, shavings, and chips has been devised, and many of them have localised use on the Continent of Europe. The great difficulty is to avoid the formation of layers impervious to the draught.

SAWDUST BRIQUETTES.

Methods of briquetting sawdust have been satisfactorily developed in connection with the distillation industry. Some of the methods will be discussed later under "Distillation Process."

The briquetting of saw dust for fuel has now been carried on extensively in America, where several plants are engaged in this manufacture. The greatest difficulty to be overcome is the drying of the sawdust for wet sawdust will not bind well. Various methods have been adopted. Usually exhaust steam is used, the sawdust being carried forward over iron plates heated by the steam, or blown along in a current of air heated by blowing it through steam heated coils.

If the sawdust is resinous there is no need to add a binder, and pressure alone forms a coherent briquette. In other cases pitch or residues from petroleum distillation or waste sulphite liquors from paper digesters is used as a binder. The binder is added to the dry warm sawdust, and the mixture, or sawdust alone if no binder is used, is subjected to heavy pressure in various forms of press. In some cases the briquette is bound together by wire ties, and in other by means of a core or tarred jute.

Sawdust has also been briquetted with waste sulphite liquors from pulp mills, and used either as fuel or for distillation. This would be an ideal process for a paper mill running on mill waste.

ARTIFICIAL WOOD.

Many forms of artificial wood are formed by binding sawdust with ox-blood, starch, glue, flour, etc., and pressing. Several types of boards for building purposes were investigated to in England during the war. One of the most promising methods seemed to be to give the saw dust a preliminary treatment with plaster of paris and then mix with cement. Such board must stand nailing.

Very fine boards can be made from 50 per cent. saw dust and sorel cement. They are cast on glass, and so have a smooth polished surface. Very pretty effects can be obtained by colouring the sawdust particles such boards should prove a good substitute for asbestos boards, and could also be used to replace ply wood in furniture making, and especially in office fittings.

FLOOR SWEEPING COMPOUNDS.

A great many varieties of such compounds are made composed mainly of sawdust and oil, with or without sand. The sand is omitted for compounds for polished floors, as it leads to scratching.

CLAY PRODUCTS BURNING.

Sawdust is added to clay in the manufacture of porous bricks and tiles. The sawdust burns during the process, and leaves the cavities throughout the manufactured article. Dry sifted sawdust is used to give a uniform result. This method could be greatly extended in the manufacture of partition tiles for cold storage construction.

SOAP MAKING.

Quite a lot of saw dust is added to cheap hand soaps. Its action is to carry the soap into creases and folds of the skin, just as workmen often use oil and sawdust to remove grease from their hands.

WALL PAPERS.

Velvet wall papers are made by sprinkling on sized papers coloured sawdust to produce the desired effect.

LINOLEUM.

In the manufacture of linos and similar substances wood sawdust is used, and the establishment of this industry would absorb a fair quantity of this material.

PLASTER BLOCKS.

By using saw dust instead of sand in the manufacture of plaster blocks very durable blocks result. They have considerable elasticity, and permit of nails being driven into them.

Besides the above uses some of the most important applications of sawdust as the manufacture of oxalic acid, carbide, carborandum, alcohol, etc., will be dealt with in a subsequent issue.

GLYCERIN SOAP—III.

THE preliminary step of this method is to prepare by full boiled process a pure neutral stock soap of tallow rosin base which involves four distinct operations viz. (1) Pasting, (2) Graining, (3) Boiling on strength, and (4) Fitting or Settling. Take 9 mds. of fine Australian tallow or its indigenous equivalent and 3 mds. of rosin either W. W. (water white) or W. G. (window glass) quality. The common quality ranges from very dark to almost black, hence, if at all used, it should be selected as far pure as possible. Take also 6 mds. of lye at 38°B prepared from 76/77 % (solid), 98/99 % (flake) or 98° (powder) caustic soda which are all the same in strength differing only in commercial gradation and physical properties. Dilute half of the lye to 10°B and the remaining half to 18-20°B. Run the tallow into the soap boiling pan and when melted, add the 10°B lye and boil. When the fat is emulsified add the higher degree lye little at a time and continue boiling. Thus the emulsified fat will change into a pasty mass. At this stage the soap mass will often tend to jam together which should be prevented by the addition of lye that will break the clotting and keep the soap in a pasty liquid. The soap should be tested from time to time, first as to greasiness when pressed between the finger and the thumb, and second as to any "bite" when tasted. When no greasiness is perceived, and the soap gives a distinct stinging sensation on the tongue add the rosin, powdered or broken into small pieces. Go on boiling until it seems to be completely saponified. Test the soap again and if it behaves as on

previous test the soap is ready for the 2nd. operation. It should be noted that both tallow and rosin are easily saponifiable with dilute lye while a strong solution retards their saponification, hence, water may be added to the soap if necessary to supplement the deficiency caused by evaporation, in order to maintain the requisite dilution. Another point is that rosin and tallow should not be boiled together, if boiled together the saponification will be much disturbed by rosin. Either of them should be saponified first and the other added later. It is, however, better to saponify them separately and then to mix and boil the two soaps in the pan. Rosin may also be saponified by sodium carbonate which is cheaper.

GRAINING.

Soap is insoluble in strong caustic solution, and all soaps except those of coconut, and palm kernel oils are insoluble in moderately strong solution of common salt. If therefore, to a solution of soap strong lye or salt either solid or in the form of brine is added the soap is thrown out of solution as a granular mass, which gradually separates at the surface leaving the strong lye or brine underneath which is called "spent lye" and this process is known as graining. Thus graining may be effected either with strong caustic solution or salt. Of these two materials,—caustic soda and salt, the use of the latter is more advantageous for two reasons viz. (1) it is cheaper and (2) it has some bleaching effect due to liberation of chlorine (salt i.e. sodium chloride when decomposed splits up into sodium and chlorine). Apart from purification the most important feature of this operation, now, is to separate gly-

cerin from the soap, which is subsequently recovered from the spent lye, though rarely practised in our country. It has already been stated that tallow and rosin soaps cannot absorb much alkali or salt, hence 5 % salt on the total fatty stock will be enough to "cut" or grain out the soap.

Now, as soon as the pasting stage is complete throw into the pan 24 seers of salt if the soap contains enough water and if not add the salt in solution, and boil vigorously until the liquid soap having been granular rises to the surface. Then stop boiling, and allow the contents of the pan to rest for several hours preferably overnight when the soap will completely separate from the salt liquor underneath. Glycerin being readily soluble in water even in the presence of an excess of salt it is removed for the most part from the soap, and separates in the salt solution. Run off the spent lye through the cock or key of the pipe fitted at the bottom of the pan.

After having drawn out the spent lye the granular soap mass or "open soap" as it is technically called is hydrolised or "closed" i.e. converted once more into a homogeneous liquid by either adding water and boiling or by boiling with open steam, in case of steam boiling in which condensed steam closes the soap. The liquefied or closed soap is then ready for the 3rd. operation.

BOILING ON STRENGTH.

The importance of this operation is to effect complete saponification of any fatty matter not saponified during the pasting operation. After the soap is closed add successively small quantities of

caustic soda solution of 20°B and boil vigorously (with closed steam in case of steam boil) until the alkali no longer being absorbed gradually begins to grain the soap out of solution. The soap lying near the side of the pan should occasionally be shovelled to the centre. The boiling should, on no account be hurried but the process allowed to take its time so that the last trace of fat is saponified. Add a slight further excess of alkali to be doubly sure, and continue boiling until the soap appears sufficiently open and flaky. Draw out fire or shut off steam and let the contents of the pan repose overnight when the open soap will again form a mass leaving an alkaline lye underneath called "half spent lye" which being strongly alkaline may be used in pasting a fresh batch of soap stock.

This operation is often dispensed with by many of our soap factories. They carry on the pasting operation with an excess of alkali which however matters little as glycerin is not recovered by them, in which case a corresponding excess of acid might have been wasted for neutralising the spent lye already rich in alkali. Again, in the fitting operation the soap is first given a good boiling with a little addition of lye so that the traces of free fat cannot escape saponification. In our case, however, this operation should not be ignored as rosin is too perverse a substance to be easily saponified.

FITTING.

This operation is very important and at the same time somewhat difficult. The quality, rather neutrality of a soap chiefly depends upon careful performance of the procedure. The object of this

operation is the ultimate purification of the soap by the separation of "nigre" a darker or inferior soap together with other impurities. Having run off the half spent lye from the soap which is now again in the granular state, close the soap very carefully by adding water and boiling (or with open steam in case of steam boil), until the soap just reaches a definite degree of closeness, the right point being when the soap is almost closed and only drops off the shovel with difficulty. This is "fine fitting." (But "coarse fitting" is necessary in making bar soaps or a washing soap in which the fitted or resulting soap retains a little excess of alkali. In the latter case, however, the right point would be when the soap leaves the shovel readily in a few large flakes). At this stage it is given a good boil to render the soap as bulky as possible which facilitates the separation of nigre, after which fire is withdrawn or steam shut off, and the pan covered up.

Another successful method practised by some of our soap makers is, the granular soap is first hydrolised and when completely closed it is given a brisk boiling that renders it very bulky. The overflowing is checked by stirring the mass vigorously with scoops. In case of open furnace boiling, a little addition of lye may also be necessary if the soap at the bottom of the pan tends to char. As soon as the soap indicates separation of lye, boiling is stopped, a few buckets of water is sprinkled over the mass to check formation of grain and the soap near the side of the pan is shovelled on to the centre. To test the closeness, a trowel is dipped into the soap and taken out. If the soap adheres to the trowel yet water

trickles down with somewhat difficulty when the trowel is held erect the right point is reached. The pan is at once covered up, preferably with a tin or iron sheet, and wrapped with gunny bags and blankets so as to preserve heat and the contents allowed to rest. The nigre will begin to separate after nearly 24 hours but the soap should be left another 24 hours or more, the time necessary depending on various factors notably the size of the boil, the quality and nature of the raw materials used, and the atmospheric temperature. For such a small charge however, nigre has been found to be out, in such a clime as we are in, within 24 hours, nevertheless the pan should not be uncovered before 48 hours is past. It should be remembered, however, that preservation of heat is an essential factor for ousting the nigre and the charge, therefore, must consist of at least 8 mds. of soap stock to effect complete separation of nigre, and greater the quantity taken, better the result obtained. Some soap makers use brine in the fitting operation. After the soap is completely closed brine is added little by little to facilitate separation of lye so as to arrive at the requisite degree of closeness which is just the mid-point between hydrolysis and separation of lye. This reverse method is not harmful though, yet the use of brine is injudicious as the resulting soap is likely to retain a certain percentage of salt which is objectionable.

After standing the requisite time the contents of the pan will be found to have separated into 4 distinct layers. At the top there is a frothy crust about 1" thick underneath which is the good soap

called "neat soap" looking like fine jelly or molten gold which should form about 80 %, and below this is the nigre amounting to 15-20%, and at the bottom of the pan there will be a small quantity of alkaline solution. The proportion of nigre varies considerably according to the closeness of the fitting operation. In fine fitting, in which too much water is added, the proportion of nigre becomes too large while in coarse fitting in which less water is used, and the soap contains more free alkali, the quantity of nigre is smaller.

The crust may be mixed with another charge at any time before fitting; and a washing soap may be made by the nigre or the nigre may be treated with a bleaching agent of which stannous chloride is most commonly used, a 20 % solution of the same is used in the proportion of 0.25 % on the nigre. The bleached nigre after neutralisation by the fitting operation may again be fit for such a soap base. Transfer the neat soap into the frame. On cooling, which will take some 3 or 4 days open out the frame, and cut the soap block into slabs, bars and finally into slices. Spread the chips on wooden trays and get them dried either in a hot chamber or in the sun, care being taken that they might not be much contaminated with atmospheric impurities. If convenient, the chips may be milled or powdered.

Now take 20 lbs. of the dried soap, and dissolve the same in 8 pints of industrial alcohol, by warming under a reflex condenser to about 150°F. Industrial alcohol which will be discussed later on, is ordinarily 90 % alcohol specially denatured for industrial purposes with

5 % wood naphtha or any other agent (such as castor oil and caustic soda to certain percentage), as considered suitable by the excise authorities. For convenience' sake the soap may also be dissolved in a covered pan placed on a water bath. Add 5 lbs. of glycerine and colouring matter if any. In order to impart a very dark reddish brown tint as of Pears glycerin soap add about 10 gr. of leather brown (commercial brand) dissolved in 6 oz. of alcohol or boiling water, to the molten soap. The alcohol may be distilled off and recovered if permitted by the excise license. To the residual soap which is a viscous mass or otherwise fluid, crutch in 4 oz. or more of any of the following perfume compounds, and run the soap into special moulds in the shape of pipes and having the diameter of the desired soap. When cold, the soap in the form of bars is pushed out of the moulds and cut into pieces of required size. Keep in exposure for several days, get them polished with a moist cloth, and stamped. Then, season the cakes for several months at about a temperature of 95°F when they will become quite transparent. Polish them again with a piece of linen moistened with alcohol and put into boxes. To enhance commercial importance spray perfume diluted with a little alcohol into the boxes and wrap the same with glazed paper.

PERFUME COMPOUNDS.

I.

Bergamot Oil	1½ oz.
Citronella oil (Java quality)	2 oz.
Cananga oil	3 oz.
Clove Oil	3 oz.

Lavender Oil	6 oz.
Tincture Musk	½ oz.

20

1 lb.

II.

Geranium oil	2 oz.
Cassia oil	4 oz.
Lavender oil	8 oz.
Sandal oil	2 oz.

1 lb.

III.

Thyme oil	10 dr.
Cassia oil	14 dr.
Clove oil	1 oz.
Lavender oil	6 oz.
Safrol	5 oz.
Tincture Musk	1 oz.

1 lb.

—BY R. GHOSE. (Soap Expert).

INDIAN SCIENCE CONGRESS.

THE twenty-second session of the Indian Science Congress was held in Calcutta early this year under the presidency of Dr. J. H. Hutton. More than one speaker including His Excellency the Viceroy, laid stress on the intimate connection between science and public welfare and the services that it is rendering and can render to the cause of industrial development and economic improvement.

Theoretical researches have no value of their own and there is no connection between them and the practical results measured in the happiness and well being of humanity. We know that scientific research is not to be considered as if it was an order for fine dress to a tailoring shop. Research to be of any value must

be untrammelled by the clamour of an ignorant public. Making due allowance for all these considerations we think the demand is by no means unreasonable that the connection between scientific research in certain considerable directions at least, and industry, agriculture, public health etc., must be direct in days to come.

Let us now go through the proceedings of the different sections of the Science Congress.

PHYSICS SECTION.

In course of a popular lecture on the Structure of the Nucleus and the Transmutation of Elements," Dr. B. Venkatesachar said:—

According to the atomic theory every element is an aggregate of indivisible units—the atoms—the atoms of any one element being all alike. The idea of the indivisibility of atoms has been overthrown now.

The atom was really a complex structure. A matter particle according to modern views has also a wave character. From the standpoint of the particle picture the atom consisted of a central part called the nucleus, with a charge of positive electricity, where almost the whole of the mass (weight) was concentrated. The nucleus might be compared to the sun and the other electrons to the planets. The hydrogen nucleus has one planetary electron, helium two, lithium three, gold 79 and so on. The nucleus of the hydrogen atom was called the proton and taking the electric charge on it as one, the net electric charge on the nucleus of any other atom gave its atomic number. The atomic number determined the chemical and physical properties of the particular

element. The protons and electrons are the bricks out of which the nucleus itself is built.

Continuing the lecturer said:—

Lord Rutherford, in the Cavendish Laboratory has performed the feat of transmuting one element into another; for instance, when nitrogen is bombarded by alpha particles, the alpha particle during a direct hit enters the nucleus, knocks out a proton inside it and takes its place, and nitrogen is changed into oxygen. The dream of the alchemist was to change baser metals into gold. If we can knock out one proton from the nucleus of the mercury atom we will get the nucleus of gold. Such transmutation as we can carry out in the laboratory is not at present on a large scale.

CHEMISTRY SECTION.

Dr. A. C. Sircar reviewed the recent work which has been done with the object of utilizing the higher coal-tar hydrocarbons, and began by pointing out how the first synthetic dyestuff, used in dyeing textiles and other materials, was prepared by Perkin from some of the constituents of coal-tar in the year 1856. Since that time the chemical investigator has produced from it a constant stream of most wonderful and varied products of both scientific and commercial importance.

Special stress was laid on the work that has been done in India by the late Dr. E. R. Watson and the President himself and their pupils, in connection with the higher hydrocarbons.

Finally, the problem of the future supply of the raw materials (that is, higher coal-tar hydrocarbons) was con-

sidered and it was pointed out that so long as high-temperature carbonization is practised in gas and coke ovens, there will be a sufficient supply of those hydrocarbons.

If in future the high temperature carbonization methods are replaced by a general use of low temperature carbonization, it is only then that difficulties may arise. But it was again pointed out that already methods have been worked out by which these complex hydrocarbons can be synthetically built up from the more readily available simpler substances and, should necessity arise, the inventive genius of the technical chemist would further perfect these methods and synthetically produce the hydrocarbons on a commercial scale.

GEOLOGY SECTION.

In course of his address Dr. Krishnan, president of this section dealt with some questions connected with the study of the Dharwarian rocks which are among the oldest rocks of the Indian Peninsula.

He divided these rocks into three divisions or groups, the oldest division being made up, to a large extent, of igneous rocks, the middle division of manganese ores and marbles, and the upper division of banded iron-ore rocks.

The address contained a short review of the distribution of the representatives of these divisions, particularly in Bihar and Orissa and in the Central Provinces.

In the second part the nature and origin of some types of rocks in these formations were discussed.

The marbles are thought to be chemical precipitates, the precipitation

being to some extent helped by primitive organisms.

The carbonaceous slaty rocks were formed probably in a manner similar to that of the black shales of the coalfields, the carbon content having been derived from some of the earliest forms of plants and animals.

The iron content of the peculiar banded rocks, Dr. Krishnan said, is regarded as derived by the weathering of the land masses of those times, and not from volcanic sources as suggested by some.

ANTHROPOLOGY SECTION.

The subject of anthropology, remarked Dr. Ghureye, was still new and strange enough to evoke different reactions in the minds of different people. To the layman it conjured up pictures of skulls and other bones, sometimes of the "weird" customs of "savage" peoples and "curious" implements of stones and bones.

The explanation of this popular conception lay in the growth of this science and in the fact that it comprised three branches dealing with aspects of man's history which were not as yet properly integrated in the courses of study in anthropology and in the practice of professed anthropologists.

Such study was bound to convince people of the reality of culture-contact, and of the part such contact has played in the shaping of civilization. That culture did not progress uniformly but showed cycles of advance and regress, that certain highly developed cultures had perished while other peoples who had but the rudiments of culture had made great progress were very important lessons for Indians.

Younger generations imbibing these lessons would develop a correct attitude towards the situation which had arisen out of contact with Western civilization.

AGRICULTURE SECTION.

Indian Agriculture and Plant Breeding was the subject of an interesting address delivered by Dr. F. J. F. Shaw, President of the Section of Agriculture of the Indian Science Congress.

Dealing with the improvements in Indian crops which have resulted or may result from the work of the plant breeder, Dr. Shaw in course of his address said:—

"The work of the plant breeder has for its object the improvement of agricultural produce either in quality or yield. At the present time when prices of agricultural produce are low the improvement of the quality of agricultural produce offers a more promising field of research, in the economic sense, than the production of high yielding varieties. It is, however, not possible to draw a sharp line of demarcation between these two goals of the plant breeder.

Improvement in the quality of a crop may result from the production of a type which is resistant to disease and the reduction of the loss due to disease will inevitably be reflected in increased yields. Again the labour of the breeder may result in the evolution of types which possess a shorter life cycle than that of the established variety; such a property will produce, in the case of a North India rabi crop, an extension of the area of the crop towards the South, where an earlier hot weather necessitates an earlier harvest, and consequently increased pro-

duction. It is evident therefore that the present economic depression militates heavily against the chances of the plant breeder producing results of immediate economic significance. Notwithstanding this, however, steady progress has been achieved in India both as regards results of immediate importance and in laying the foundation for future developments for more prosperous times.

"Oil seeds are a crop of great importance in Indian agriculture, and as a result of the Ottawa Trade Agreement Indian vegetable oils and oil seeds now enjoy substantial tariff preferences in the United Kingdom. To exploit fully the advantages of these tariffs, work on the improvement of oil seeds is essential and is in progress at various centres in India. Linseed is one of the oil seeds on which extensive investigations have been made with the object of producing a white or yellow seed of high oil content and good yielding power. White or yellow colour in the seed is preferred to brown as the lighter coloured seeds yield a white oil. Generally speaking it is believed that high oil content is associated with large size in the seed and because of this belief "bold" seed commands a higher price than small seeded types. The types of linseed, however, which grow and yield well in the Gangetic India are the small seeded types, and, with the object of producing a large seeded type capable of good yield in the Gangetic alluvium, crossing has been carried out between small seeded types which grow well in northern India and "bold" seeded types which grow well in peninsular India. Numerous hybrids have been produced of high oil content and medium

siders, will, in many respects, weaken the prospect of united action which is so essential to the industry at the present time.

The second consideration is with regard to standardisation. There are many items and operations in which standardisation can be effected. Let us take the question of quality, which is of primary concern. Much could be done in this respect by a Central Technological Research Laboratory, which I suggest, the Association should establish as soon as possible. Such an institution would disseminate information on its researches among the members, and help not only in matters relating to immediate requirements, but also in matters of a general technical nature and the progressive improvement of the industry. The cost of providing these essential services would be far less and the results much more effective than if each factory undertook such technological investigations individually for its own particular benefit.

The next point for consideration relates to the joint purchase of raw materials, either on a co-operative basis, or on a system of pooling.

As regards the sizes of different kinds and grades of soap, their wrapping, packing, etc., there may be formulated a standard at least for the cheaper grades so that the large mass of consuming public may get soaps for their daily use at the cheapest rate.

Then comes the question of uneconomic units, or small factories, who have not adequate financial nor manufacturing and marketing facilities. Such factories, should not, and indeed can not, live at all events for any length of time. The Association may induce them to combine and form a competent and comparatively large unit or to produce semi-processed materials only, suitable for use in larger factories. This is essential, and something like it is in operation with great success in Japan.

Lastly, the Government should be moved in regard to the purchase of

the bye-products, glycerine, for instance, recovered by the factories.

HYALINE BLOCK OR ALUM STONE.

THIS substance is to-day largely employed by barbers. Applied to the face after shaving, it contracts the pores of the skin and assists in protecting it from exposure to cold and from bacterial infection. The epidermis is exceedingly sensitive to all external influences after shaving, and also to the lathering with the brush so much so that in some countries barbers are forbidden to use shaving brushes except those belonging to the individuals to be shaved.

The alum block tends to remedy or alleviate, these troubles. It is composed principally of alum, which explains its action on the skin. Alum is dissolved in its own weight of water, which is then evaporated, a little glycerine and a trace of corrosive sublimate to increase the germicidal action being added. Sometimes a little menthol is added to produce a refreshing effect after the "frü de rasoir." The mixture when nearly free from water, is poured hot into the moulds and solidifies to the well-known crystalline blocks, which are rubbed with hot water on the surface to make them smooth, and are then ready for sale.

Rohde has taken out a patent for their manufacture, as follows: alum is liquefied on a water-bath, in its own water of crystallisation, and to it is added 1 per cent. of glycerine, and 0.5 per cent. of zinc white. The mixture is then poured into moulds. It is non-poisonous; the alum is soothing and astringent, the formaline is antiseptic, the borax aids in stopping bleeding, the glycerine softens the skin, and the zinc oxide has a healing effect.

The mass, however, is rendered less transparent by these additions. To obtain crystal-clear blocks, it is necessary to crystallise, alum in large pieces, saw it into small blocks, and polish the surfaces with boiling water. A little formalin or other disinfectant can be added to liquefied alum without altering its transparency.

ENCLOSURES IN PACKAGES.

ATTRACTIONAL wrappers or containers are the outstanding features of all branded products that command a big sale in the market. The manufacturers and the distributing agents fully acknowledge the commercial value of this and do not spare any pains to present their products in as decent and dignified a shape as possible.

Enclosures in wrapping with goods also are coming into vogue and few packets of popular articles are now a-days without them. These may be in the form of leaflet or pamphlet. But the full value of these is not still completely appreciated by the manufacturers.

Remember that these may be made to serve the purpose of increasing the popularity of the product, or of extending the sales of other lines made by the firm concerned and it is no exaggeration to say that the preparation of printed matter for enclosures is too important in sales promotion to be lightly overlooked.

One firm of food manufacturers is for ever experimenting with new methods of packing and new forms of printed enclosures. They find that, just as with their press advertising they have to make frequent changes not only in "copy", but in the style of their selling appeal, so printed enclosures in packets and containers must be altered in size and appearance—and, just as important, in colour—at intervals, in order that their use may be fully justified.

HOW ONE COMMODITY INTRODUCES ANOTHER.

It is their invariable custom to use one commodity as a means of introduc-

ing another, and, for this purpose, sample forms are enclosed inside each wrapping. This method has proved very satisfactory in more than one way. For one thing the firm has used it as a means of making one product advertise another. The changes also provide effective tests as to whether or not the printed enclosures are read, and what form of matter brings the best results.

An enclosure which merely repeats the name of the goods, or shows a picture of the trade-mark, or which is just a replica of what is on the outer cover, is really so much waste paper, and the expenses of printing and inserting it might just as well be avoided. Some food products, domestic necessities manufacturers are finding it worth while to follow the example of the cigarette makers by enclosing small pictures or cards inside the wrapping, thus enlisting the aid of the younger element in the household to popularise their products. But it is not only in connection with the smaller types of branded commodities, polishes, cigarettes, chocolates, and the like—that the message sent out in this way can help the sales.

GREAT AID IN MAINTAINING CONFIDENCE.

Paint and enamel manufacturers, makers of office and domestic equipment, hardware and ironmongery manufacturing houses small machinery specialists, and other producers have found the printed enclosure a great aid in creating and maintaining the public confidence in their brands and products.

In days of highly-paid labour such as these, many men do their own house

decorating and exterior renovating, and this has increased the public demand for such things as tools, paints and varnishes. In the past, such goods were sold in bulk to the trade; but now new methods of packing and wrapping are necessary and those firms which are prepared to provide explanatory matter with their goods, or a booklet explaining the way to get the best results, are the people who are getting the repeat orders.

HOW SALES ARE OFTEN LOST

A retailer explained recently that he has many complaints from users of a well-advertised brand of enamel, because the stuff dried "patchy". He said that it was merely due to the fact that users did not apply it properly; and, in order to prevent further complaints, he now made a practice of explaining to each purchaser the right way to use the enamel. In this particular case, no instructions were enclosed with the tin of enamel, and, unless all retailers stocking this line took the same interest in customers' requirements as this trader, who went to the trouble of explaining fully to each purchaser how the enamel should be used, it is probable that the manufacturers lost quite a lot of sales.

The experience of this man demonstrates very carefully the importance of enclosing instructions or explanatory matter with any kind of product the method or of the purpose which is not perfectly obvious to the uninitiated. It is imperative, too, that the leaflet or booklet on which the details are printed shall be folded in such a way that it cannot possibly be overlooked. The matter should be as brief and concise as possible,

and might well be followed by a short selling talk on other allied lines made by the same firm.

HOW TO GET THE ENCLOSURE READ.

A problem which faces the manufacturer is how to get the enclosure read. Many firms find it a good plan to direct the consumer's attention to the printed matter inside by means of a prominent notice in a distinctive colour on the outside wrapper. "Read the condition of Free Gift Scheme on the leaflet round the box." "Study the directions for use given inside the wrapping." "See particulars on back of wrapper," are injunctions now being used.

Generally speaking, the main function of the printed enclosure should be to explain fully the various uses and purposes of the product in connection with which it appears, and the correct method of adopting it to its purpose. Thus, by helping to get a particular proposition used to the fullest advantage, the enclosure is one way of assuring that the product gives the purchaser confidence and satisfaction.

LABOUR AND WAGES IN JAPAN.

AT the annual meeting of the "Malda in Calcutta" Society held at the Buddhist Hall, Calcutta S. J. Rabindra Nath Ghosh, Research Fellow, Bengali Institute of Economics, read a paper on "Labour and Wages in Japan", from which we quote the following.

POPULATION AND INDUSTRY.

S. J. Ghosh said that it was the persistence of very high birth rate which was primarily responsible for the remarkable growth of population in Japan

in recent years, it is much higher than in most of the western countries.

This enormous increase in population could not be absorbed in agriculture. Even before Japan became industrialized the agricultural population was extremely dense, average land holding being 2.50 acres nearly. The pressure of population upon land was relieved by increased absorption in industry and trade. In 1900 the number of factories were 7,284 and wage-earners numbered 422,019. To-day the number of factories and wage-earners are 55,577 and 1,800,217 respectively.

WAGES AND PRICES.

Real wages have increased materially since pre-war days. From 1909 to 1914 wages increased faster than whole-sale prices. After 1917 to war-time inflation prices moved faster than the wages. From 1920 prices declined while the wages advanced. As the expanding labour supply was steadily absorbed by the expanding industries, unemployment was not a serious problem with Japan till recent years. The trend of unemployment today is not conspicuous.

The growth of labour dispute is also of recent date. Rapid rise in the cost of living in the war-period, precipitated the growth of trade unions.

LANDLORD AND TENANT.

After the collapse of agricultural prices in 1920 Tenant Farmers associations grew rapidly. From 1114 associations with 132,322 members in 1922 the number has grown to 3866 with 301,326 members. Agricultural disputes occurred during agricultural depression. From an average of 85 disputes in 1917 the number rose as high as 1501. Disputes were concerned primarily with the amount of rent to be paid. To promote peace Government passed the Tenant Farmers Arbitration Act.

SECRET OF JAPAN'S SUCCESS.

Sj. Satyasundar Deb, Chairman of the Meeting who lived in Japan for five

years from 1901, then began by citing a passage from the Japanese scholar Nitobe to the effect that it is the man behind the machine and not the machine itself that counts. The secret of Japan's success in industry and commerce as in other fields is to be found in the devotion to work, skill, discipline, loyalty to employers, and modest living of the Japanese masses.

At the conclusion of the meeting Prof. Benoy Kumar Sarkar who was also present, summed up as follows:—

"We must not forget that Japanese factories are provided with upto-date machineries, and workingmen with first class tools. The amount of capital invested in Japanese enterprises per head of workingmen is high. Then the associations organized by producers, merchants, shippers and other businessmen are perfect. Last but not least, Japanese scientists and engineers have begun to invent improved implements. The role of Japanese can no longer be overlooked. **HIGH EFFICIENCY WITH LOW WAGES.**

"But on the other hand", said he, "the wages and salaries prevalent in Japan are considerably lower than in the adult industrial countries of Europe and America. The food, clothing, housing and entertainments, all those items that constitute the standard of living are also much lower in Japan than in the western world. And yet the Japanese are competing with the most advanced western nations in the marketing of manufactured goods not only in semi-developed countries but even in the bazars of Eur-America. Japan has demonstrated that the highest efficiency can be combined with an alleged low standard and low wages, thereby serving to inspire all low-standard countries including India with self-confidence and hopefulness in regard to their future."

IN THE INSURANCE FIELD.

BY OUR INSURANCE COMMISSIONER.

A Plea for General Insurance Companies.

Insurance entrepreneurs in India have found operations in life insurance advantageous to them from many points of view. In the first instance, they are spared the difficulty of acquiring a big capital which is essential for underwriting fire and marine business, but which is none the less important for life insurance companies. Secondly, field prepared for life business by the European and early Indian companies offer a natural incentive and attraction to the life insurance entrepreneur. In the third place, the management of a life office of a small size does not present so many difficulties as a general insurance company would do. The problems of organisation are also easier for the life office. Principally for these reasons, the flotation of every new company in India of late has been characterised by the preference to life business. As a matter of fact, the life insurance business of indigenous companies has more rapidly developed, taken collectively, on account of these above facts more than fire, marine or motor business. The field of general insurance business in India today is largely occupied by the foreign insurance companies, mainly British. These companies have undoubtedly certain advantages over the indigenous offices. The superiority is to a great extent due to the indifference of our Indian companies to devote themselves to the proper cultivation of general insurance business. It may be argued that India does

not possess such industrial wealth or business prosperity on which a general insurance company may thrive. To this it may be replied that most of the business underwritten by the foreign general insurance companies comes from indigenous sources. It is a fact which is borne out by statistics. In any case, the profits derived by those companies contributed to a large extent by the indigenous insurants. I should like to draw the attention of the leader in indigenous insurance to the persistent neglect shown to a very important aspect of the development of our insurance business. No other branch of indigenous insurance offer such possibilities of development as do the fire, marine and motor departments. Before the domination of alien concerns, in these fields is strongly established, we should wake up and take proper steps.

A Concrete Scheme.

It must be admitted that fire insurance thrives on industrial advancement more than anything else. Insurance of residential houses is neither obligatory nor profitable in India. Also the prosperity of marine insurance depends in a large measure on the development of indigenous transport. The possibility of India's having a mercantile marine of her own still seems to be remote in view of the attitude of the British Government. Still, in both these fields, there lies a possibility of India's holding her own if the business may be properly organised

and conducted. Industrial undertakings are gradually cropping up in large numbers although of the small size, and as soon as these undertakings will be found profitable they would require some protection against accidents of fire. There is a large volume inland transport carried on in India, particularly in the Ganges and Indus Valleys. The advantage of the marine insurance of this transport is totally enjoyed by the foreign companies. In the motor insurance field of course, the Indian companies may have a lot to achieve. As a matter of fact, the few Indian companies that do general insurance business make their both ends meet by the profits they earn on the motor business. Besides these, accident insurance, workmen's compensation, fidelity guarantee provide nowadays a lucrative subsidiary list of business. I have no doubt that a company formed with a large capital with branches in all the important commercial centres of India has a great future before it. The trend of life insurance business shows that there are going to be at least half-a-dozen companies that would in a few years' time fulfil the ambition of the idealists in Indian insurance, and would be able to keep the wolf of foreign companies at bay. But is it becoming then that while possessing such proved life offices India should not have at least one or two general insurance companies worth the name? The growth of life business and life insurance companies in India ought to make the entrepreneurs alive to the fact that the scope of small life offices is becoming limited every day. It will be more so as public opinion grows in favour of credit institutions of the big size. The large-scale companies have certain advantages and can effect certain economies which the small scale ones cannot do consistent with safety. So, it is desirable in the interest of the entrepreneurs as well as indigenous business that the small units of capital which would otherwise have been employed for the purpose of life offices should combine in order to make a substantial capital for a general insurance company. The de-

tails of organisation and work, however, remain to be worked out, and should be adapted to the particular circumstances under which the companies have to work.

A Reinsurance Corporation for India.

One of the most, essential things in connection with the starting of general insurance companies in India would be to lay the foundations of a Reinsurance Corporation. In no other branch of insurance business reinsurance is so much a necessity as in the case of marine and fire. Of course, an international organisation controls the marine reinsurance business of the world, and there are fire insurance associations that work as a close combine and may put obstacles in the way of indigenous companies. But it will be easy to overcome these difficulties if a strong reinsurance corporation may be formed in India. In the life insurance field, the reinsurance business is mostly divided among Indian companies, and a reinsurance corporation is not so much an essential necessity in this field as in other, although such an institution would undoubtedly facilitate the work and methods of life reinsurance. A strong and systematic propaganda is necessary for bringing about such an outlook among the investors. The problem of capital will be very easy to solve. There is plenty of money available for investment in really profitable undertakings. A Reinsurance Corporation would not only open up certain avenues of employment of capital and trained men, but will also enhance the prestige of the indigenous business, and will serve to insure much more security for smaller companies than they can command at the present time. At a time when there is an insistent cry for the consolidation of our indigenous enterprises, the formation of a re-insurance corporation will highly advance the cause of Indian insurance. Legislative reforms are forthcoming in the insurance field, and it is the proper time to take up this propaganda for a re-insurance corporation for creating a firm footing for indigenous insurance.

SMALL TRADES & RECIPES

Increasing Adhesiveness.

Two or three drops of 10 per cent. aluminium sulphate solution added to a small bottle of mucilage will increase its adhesive qualities.

Nose Drops.

Ephedrine hydrochloride .5 part.

Chlorobutanol .3 "

Medium white mineral oil 99.2 parts.

Heat the oil to about 130°F and dissolve the chlorobutanol in it. Dissolve the ephedrine hydrochloride in just enough alcohol to effect solution and stir into the warm oil.

Paper Barometers.

Unsize, porous paper is saturated with the following solution; cobalt chloride 30, sodium chloride 15, gum arabic 7½, calcium chloride 4½, calcium chloride 4½, water 45, parts etc. Allowed to dry.

The condition of the air is indicated as follows: Rose red, rain; pale red, very moist; bluish red, moist; lavender blue, nearly dry; blue, dry.

Cold Ointment.

Spermaceti 15 parts.

Benzoated lard 73 "

Turpentine 4 "

Camphor 2 "

Menthol 3 "

Methyl salicylate 3 "

Melt the spermaceti and the lard, add the turpentine. Liquefy the camphor and menthol, add the methyl salicylate and stir this mixture into the batch.

Rub the forehead with the ointment.

Cape Gooseberry or Tippiari Jelly.

Boil and strain the fruit, put the Jin on fire to simmer; skin, and add sugar in the proportion of three or four parts to one part juice (or to taste), and cook till it arrives a jelly point. Then remove from the fire and when slightly warm put in stoppered jars.

Hair Tonic.

For falling out of the hair, use a lotion composed of water of ammonia, almond oil, and chloroform, one part each, diluted with five parts alcohol, or spirits of rosemary, the whole made fragrant with a drachm of oil or lemon. Dab it on the skin, after thorough friction with the hair brush. It may be used sparingly or abundantly, daily or otherwise.

Blackening Copper Articles.

Copper articles may be coloured a deep black by first cleaning them and then applying a saturated solution of copper nitrate, after which they are heated to bring out the colour. A sodium-sulphide solution will produce a rich, mulberry colour, which will blacken with repeated application.

Coal Economising Powder.

As every one uses coal to a greater or less extent a powder which will economise the coal is sure for a good demand. A first class mixture of this kind is produced by a combination of lamp black 8 lbs., sal-ammoniac 12 lbs., nitrate of soda 100 lbs.

This mixture may be packed in 6 oz. or 8 oz. tins. When dissolved in water and syringed over the coal it will be found to effect a great saving.

India's Industrial Progress.

Indian Sugar Marketing Board.

The constitution of the proposed Indian Sugar Marketing Board, which was decided to be brought into existence at a conference of Indian sugar mill-owners in Calcutta and Cawnpore last month, has now been finally adopted. The Board will shortly be registered as a society under the Trade Unions Act. It is also understood that applications have been invited from firms desiring to act as agents for the sale of sugar at various ports. viz., Bombay, Madras, Karachi, Calcutta and Rangoon, in order to enable the Board to decide the question of appointments of agents. It is expected that the Board will function from the beginning of 1935.

U. P. Agricultural Training.

It is understood that as a preliminary to the scheme for settling educated young men on land as a means for checking the growth of unemployment amongst the educated classes, the Government of the United Provinces has finally decided to utilise a part of the Fyzabad Government Farm for establishing a practical training centre for ten persons. In order to demonstrate the relative advantages and disadvantages of individual versus collective farming, five settlers will be given consolidated blocks of ten acres each, and the other five will be assigned fifty acres jointly between them, and will be required

to pool their income and divide it amongst themselves. The training will last three years and various facilities will be provided.

Hyderabad Sugar.

Important tentative decisions have been taken by the Hyderabad Government with reference to sugar cultivation and manufacture in the State, arising from a report on the subject by Mr. Srivastava, Sugar Technologist, Imperial Institute of Agricultural Research. At a meeting held recently between the heads of departments concerned, it was tentatively decided to float a company to which would be entrusted the work of establishing a sugar factory at Durki, in the Nixamsagar area, with an authorised capital of Rs. 23 lakhs (Hyderabad currency) of which Rs. 17½ lakhs would be issued and financed as far as possible by Hyderabad money. Special consideration will be paid to the interests of the small investor and, more particularly, to those of the local cane grower. The industrial trust fund will, if necessary, subscribe to the issued capital of the company to the extent of 40 per cent. The managing agency system is not favoured. The meeting decided, instead, to have a managing director with a seat on the board. The company will buy cane for the factory mainly from the ryots, but it is also to have an estate of its own for growing cane.

Scientific & Technical Topics.

Products of Metal Powder.

Metals, in the form of powder are being moulded into various products by the application of pressure. After being moulded, the products are heated to a definite degree to coalesce them, resulting in firm metal objects, usually free from defects. The process replaces certain methods of casting. Eighteen elements or metals, including aluminium, arsenic, antimony, boron, cadmium, cobalt, copper, chromium, iron, lead, magnesium, molybdenum, nickel, silicon, silver, tin, tungsten and zinc, are obtainable in powder form. One automobile company uses powdered sponge iron, subjected to high pressure and heat, to produce certain parts for cars.

A New Form of Rubber.

An interesting development has taken place in the rubber industry. The chemists of the Ceylon Rubber Research Scheme have just perfected a method by which it will be possible to supply the makers of rubber goods with their raw material in the form of a powder.

In the manufacture of the numerous rubber articles that are in constant daily use, it is necessary to mix the raw rubber with various compounds, in order to colour it, vulcanise it or give it particular properties.

Until recently it has not been possible to supply the industry with rubber in any form other than sheet or crepe. The use of heavy and expensive machi-

nery to masticate the rubber and mix it with the compounding ingredients has therefore been necessary. Considerable machinery is also needed for moulding the rubber into the required shapes. The cost of these operations is very high compared with the low cost of the raw rubber, and the production of very cheap rubber articles has not been possible.

During recent years there have been continuous efforts by manufacturers to reduce these production costs by breaking away from the stereotyped manufacturing processes. The greatest success has been obtained by the use of latex, that is, the milky juice of the rubber tree, from which the rubber is obtained by coagulation. Coagulation is a "curdling" process, in which a little weak acetic acid is added to the latex, when the whole sets like a junket, which gradually contracts to a compact clot leaving a clear whey or serum. The use of latex, however, has not become general and it has brought with it many problems of its own.

Rubber powder now makes its appearance and the need for heavy machinery may soon be eliminated. A simple shaking process is sufficient to mix the raw rubber with the requisite vulcanising and compounding ingredients. There are, of course, several problems in the use of rubber powder still to be tackled, but it is evident that this discovery is an outstanding contribution to the improvement of the rubber industry.

Oxygen is Man's Enemy.

Oxygen, which gives us life, is also man's greatest industrial enemy. The air we breathe contains one-fifth oxygen, and this gas is a highly corrosive substance.

When a house burns down it is simply combining with the oxygen in the air. When soap turns brown on a chemist's shelf it is merely another instance of the corrosive quality of oxygen.

But it is the motor industry that suffers most from the ravages of oxidation.

Its two chief organic essentials, rubber, and petrol, are especially susceptible. Thousands of pounds worth of these materials have been utterly wasted owing to the action of air—and now the scientists have struck back.

They have been experimenting with the development of substances known as anti-oxidants. These compounds when mixed with any product, slow down oxidation to such an extent that its usefulness and life are increased tenfold.

Films by Wireless.

The recent record-smashing flight of Scott and Black inaugurated the first regular transmission of pictures between Australia and England by wireless. Films, depicting the landing at Melbourne, were flashed across to the Central Telegraph Station of Cable and Wireless Ltd., London, in an absolutely untouched condition; even the sprocket holes in the sides of the film were shown, as these are necessary to ensure perfect timing separately to overcome atmospheric disturbances, took twenty-five minutes to complete its 11,000-miles journey. Upon arrival, the pictures were immediately rephotographed by a cinema camera and reduced from their original size of 10 in. by 8 in. to fit the standard cinema projector.

Photo-telegraphy, the name given to this remarkable system of international communication, has now been in operation between London and America since May, 1926. It is used not only for news purposes, but to transmit fashion designs,

Metal Vulcanized to Rubber.

Rubber and fabrics can be vulcanized to metals and wood by a process that produces an unbreakable bond. Expected to have a wide application in the manufacturing field, the process employs thermoplastic rubber, the composition material that is subject to application of heat and at high temperatures is quite plastic. Having the characteristic of being solvent, it may be used to form lacquer-varnish or a shellac substitute. The material possesses pronounced dielectric properties. Of outstanding importance is the plan to develop a metal-reinforced rubber tire for trucks and buses. Other applications include: auto running and floor boards, power and conveyor belting, train and high-pressure hose, unbreakable battery boxes, insulated steel roofing, moulded tool handles and paving materials.

Sandblasting Eggs.

Sandblasting seems a very harsh and dangerous treatment, but poultrymen in the United States have found that the use of an accurately adjusted sandblast is by far the best method of cleaning soiled eggs. The washing of eggs has never been generally considered an entirely satisfactory process, as the wetting of the shell partly destroys its protective qualities with the result that washed eggs do not keep as long as untreated ones. The "sandblasted" or what might be called "dry cleaned" egg keeps almost as well after cleaning as it did before, but not quite, as sandblasting removes the "bloom" or membranous covering on the surface of the egg. In the sandblasting machine the eggs are passed through powerful jets of white sand, the force of which against the eggs can be accurately controlled. The eggs travel on an endless conveyor consisting of rubber rollers, on which they roll round and round as they pass through the machine, thus exposing the whole of the surface of the shell to the sandblast. Recent machines have been put into operation which are capable of handling nearly fifty thousand eggs per hour.

Formulas, Processes & Answers.

Fugitive Inks.

3071 J. N. B., Ghota—Desires to know a formula for preparing fugitive ink.

These inks are generally prepared by employing fugitive dyes as disappearing agents. The solution of fugitive colours such as, quinoline blue and furfuraniline gives magenta writing, which soon fades away under the influence of sunlight.

Cement for Lens.

2684 B. C. S., Raghunathpur—Wants to know a cement for uniting component parts of lens.

To unite a concave with a convex lens place a drop of pure balsam of tolu on the centre of the concave surface and gently press the convex one down upon it until the balsam spreads and oozes out at the edges. Then apply a gentle heat until the balsam is found to have been hardened.

Snowflake Dressing.

The following is a good recipe for dressing canvas and buckskin foot gear, belts, helmets, etc.

Pipeclay	3 lbs.
White glue	2 lbs.
Yellow soap	2 oz.
Oxalic acid	2 oz.
Water	2 gallons.

Soak the glue in the water until soft, then heat up until completely dissolved, next add soap and acid, then pipeclay. broken small. Stir up, and when creamy strain and bottle.

Vol. XXV. No. 299.

Bleaching Tallow.

2232 S. M. A. R., Lucknow—Wants to know processes for bleaching tallow and hemp.

To bleach tallow, put it into a tank provided with mechanical stirrer. Melt it and heat it up to 220°F. Add from 7 to 10 % fuller's earth, allowing the stirrer to agitate the stock thoroughly. Fitter the tallow white hot, then cool and pack.

Bleaching Hemp.

Every bleacher of hemp knows how difficult it is to mordant and dye hemp and jute. To overcome this difficulty place these fibrous substances in a steam boiler, and let them boil for 1 hour in a sufficient quantity of soda; then rinse and subject them in a well-closed vessel to the action of chloride of lime. The substance animalized in this manner can be easily bleached. For this purpose put the hemp in a bath of hypochlorite of sodium 2° Beaume. This bath may be made by dissolving equal quantities of bleaching powder and soda ash separately, mixing the solutions and allowing the product to stand; then by decanting the clear liquor from the precipitate and diluting with water until the proper strength is obtained, viz. 2° Beaume. The hemp must be left about 3 hours in this bath, and then lifted and scoured with acetic acid, after which it is thoroughly rinsed.

Nickelling Iron, Brass, etc.

2241 W. U., Madunganj—Wishes to know the processes of nickelling iron, brass, etc. and also electro-blocks.

The nickel bath is prepared according to the following formula:—

Nickel and ammoni-

um sulphate	10 parts.
Boracic acid	4 "
Distilled water	175 "

A sheet of nickel is used as an anode.

Perfect cleanliness of the surface to be coated is essential to success. With nickel especially is this the case, as traces of oxide will cause it to show dark streaks. Finger marks will in any case render the deposit liable to peel off.

Cleansing is generally accomplished either by boiling in strong solution of potassium hydrate, or, when possible, by heating to redness in a blow-pipe flame to burn off any adhesive grease, and then soaking in a pickle of dilute sulphuric acid to remove any oxide formed during the heating. In either case it is necessary to subject the article to a process of scratch brushing afterwards; that is, long-continued friction with wire brushes under water, which not only removes any still adhering oxide, but renders the surface bright.

To certain metals, as iron, nickel, and zinc, metallic deposits do not readily other this difficulty is overcome by first coating them with copper in a bath composed as follows:—

Potassium cyanide	2 parts.
Copper acetate, in crystals	2 "
Sodium carbonate, in crystals	2 "

Sodium bisulphite	2 parts.
Water	100 "

Moisten the copper acetate with a small quantity of water and add the sodium carbonate dissolved in 20 parts of water. When reaction is complete, all the copper acetate being converted into carbonate, add the sodium bisulphite, dissolved in another 20 parts of water; lastly, add the potassium cyanide, dissolved in the remainder of the water. The finished product should be a colourless liquid.

Electro-Blocks.

Electro-blocks are made by the application of electro-typing in the copying of wood engravings in electrolytic copper. First well cover the engraved wood block with plumbago or simply moisten it with water; then place it on a level bench and fasten round it a metal frame somewhat higher than the block. Now place in the centre of the engraving a lump of softened gutta-purca and forcibly spread it outward (i.e. towards the frame) by which air becomes excluded. Now place a plate of cold iron over the gutta-purca with gentle pressure. As the gutta-purca becomes harder increase the pressure gradually by means of a press. When the mould has cooled, carefully separate it from the block and again cover well with plumbago. After this, attach with it connecting wire and "guiding wire". The mould is now ready for the depositing bath containing a saturated solution of copper sulphate. Allow it to remain there until a shell of sufficient thickness is obtained, which depends upon the size of the mould and the strength of the current employed.

Now remove the mould from the bath and rinse with water and then carefully detach the shell from the mould and immediately apply solder or a mixture of tin and type metal at the back of the electrotpe after being brushed over with a solution of zinc chloride. Next trim off the edges of the electrotpe and make it plain and level. Lastly, mount the plate on suitable wood block by means of iron pins driven into the level edges of the packing metal.

Blue Mottled Soap.

2266 E. A. K., Mombassa—Wants to know the process of manufacturing blue mottled soap and turpentine oil.

For preparing blue mottled soap two-soap pans are usually required. In one pan a sufficient quantity of soap is prepared from tallow and palm-kernel oil or coconut oil, from which it is afterwards removed to the second pan and for every 1,000 lbs. soap are added 250 lbs. of silicate of soda solution, the whole being thoroughly incorporated by boiling until the proper condition of mottling has been reached. This can be determined only by experience. The colouring matter, ultramarine blue worked up into a thin paste with water, is then slowly sprinkled over the surface of the boiling soap until the full quantity has been introduced; the amount of ultramarine blue to the portion of soap varies from 5 to 10 lbs. If the soap be in too liquid a state the colouring matter is apt to permeate the entire mass giving it blue tint throughout, and the desired mottled appearance will not be attained. When properly conducted the blue pigment shows in the soap in blue patches which

appear in strong contrast to the white ground of the soap, giving it a pleasing appearance to the eye.

Manufacture of Turpentine Oil.

Turpentine oil is usually manufactured from oleo-resin a gummy substance obtained by tapping chir pine (*Pines logefolia*) a species of plant found in large numbers in the Punjab and the United Provinces.

To extract the oil, melt the oleo-resin by the help of steam. In order to enhance the process add a little turpentine oil obtained from previous operation. By this treatment the dirt, water and other suspended impurities will sink to the bottom of the vessel. Then transfer the clear oleo-resin into a suitable tank, from which from time to time a measured quantity of the substance is passed into the distilling vessel, which is provided with a steam jacket and kept hot by steam under pressure to maintain any desired temperature. Inject the steam under pressure whereby the oil of turpentine together with water vapour is distilled over. Pass the vapour through an empty vessel and then into a condenser. The object of putting the empty vessel into the intermediate position is to catch any aleo-resin that may have come over during the process. The liquid turpentine and water which collect in the receiving vessel at the further end of the condenser are now separated from each other mechanically. The oil thus obtained contains much impurities which may be removed by redistilling the oil in a separate vessel and passing through lime water. The purified oil still contains traces of water which are at pre-

sent removed by storing the oil for a time in bulk.

Water Soluble Prussian Blue.

2282 M. I., Udaipur—Wishes to have the process for preparing water soluble prussian blue.

Sulphate of Iron	100 lbs.
Potash alum	200 lbs.
Yellow prussiate of potash	100 lbs.

Dissolve the sulphate of iron and potash alum in five times its weight of cold water, respectively, and add the mixture to the yellow prussiate of potash dissolved in ten times its weight of cold water. Settle, wash and filter.

Now to make soluble proceed as follows: Dissolve 35 lbs. of oxalic acid in boiling water. When cold add to the solid prussian blue already prepared while in pulp. Filter, press and dry.

Colouring Brass Articles Red.

2304 N. J. R., Cocanada—Desires to know processes for colouring brass articles, etc.

Electroplate the brass articles in following solution at 110°—120°F. at current density of 6 ampere per sq. ft. using cast bronze or electrolytic copper anodes.

Copper cyanide	3 oz.
Zinc cyanide	$\frac{1}{2}$ oz.
Sodium cyanide	4½ oz.
Soda	1 oz.
Ruchell salts	2 oz.
Water	1 gallon.

By adjustment of current and temperature any shade between copper and yellow brass may be produced. A suffi-

ciently thick coating is needed so that it may stand an acid dip.

Cold Soldering.

This is generally used for soldering articles which cannot stand a high temperature. The following recipe will give good result:

Crush and mix 6 parts sulphur, 6 parts of white lead, and 1 part of borax. Make a rather thick cement of this powder by triturating it with sulphuric acid. The paste is spread on the surfaces to be welded, and the articles pressed firmly together. In 6 or 7 days the soldering is so strong that the two pieces cannot be separated, even by striking them with a hammer.

Imparting Brass a Golden Colour.

To give brass a golden colour, it is dipped until the desired shade is obtained into a solution of about 175°F., produced as follows: Boil 4 parts of caustic soda, 4 parts of milk sugar, and 100 parts of water for 15 minutes; next add 4 parts of blue vitriol, dissolved in as little water as possible.

Test for Honey.

Honey is frequently adulterated with treacle, sugar syrup, potato farina, starch, and wheat-flour. The first may be detected by the colour and odour; the second in the way of mixing a sample with a solution of copper sulphate and hydrate of potassium added in excess; a blue liquid is obtained under sugar; and the others by the honey not forming a nearly clear solution with cold water, and striking a blue colour with iodine. When it con-

tains wheat-flour and is heated, it at first liquefies, but on cooling it becomes solid and tough. The absence of starchy matter or flour is easily proved by the following test: Boiled with water for 5 minutes and allowed to cool, it should not become blue with iodine water—indicating absence of flour.

Writing Inks.

2317 L. N. R., Fatehpur—Desires to have recipes for preparing writing and fountain pen inks.

BLUE-BLACK.

Gallic acid	60 grains.
Ferrous sulphate	100 "
Dilute sulphuric acid	4 fl. drams
Powdered gum acacia	200 grains.
Liquid phenol	30 mins.
Glycerine	140 "
Phenol blue	16 grains.
Distilled water, sufficient to produce	20 fl. oz.

Dissolve the ferrous sulphate, gum acacia, liquid phenol, glycerine and sulphuric acid in 8 oz. of distilled water, with the aid of gentle heat; continue the heating until the liquid just begins to boil, and add to it gradually the solution containing the ferrous sulphate, etc., shaking after each addition. Make up to the required volume (20 fl. oz.) with distilled water, filter, and add the phenol blue, shaking until dissolved.

For fountain pens the gallic acid may be increased to 80 grains, the ferrous sulphate to 120 grains, add the phenol blue to 20 grains and the gum acacia reduced to 160 grains. The volumes of ink should be increased to 40 fl. oz. by addition of water.

BLUE.

✓ Resorcin Blue	48 grains.
Sugar	192 "
Oxalic acid	10 "
Distilled water	19½ fl. oz.

Mix the dye with 1 fl. oz. of cold water, set aside for two hours, then add the remainder of the water, in hot state, and the other ingredients and stir until dissolved. Any other water soluble blue may be used such as phenol blue, methylene blue, etc.

RED.

Erythrosine	4 parts.
Gum arabic	4 "
Boric acid	4 "
Distilled water	40 "

Dissolve the gum arabic in half the quantity of hot distilled water and the colour in the remaining half of the water. Then gradually stir the colour solution into the hot gum arabic mucilage. Lastly add the boric acid.

Green Fountain Pen Ink.

Green ink can be produced by dissolving aniline dyestuff such as Neptune Green S. G., Diamond G. & B, Light Green S. F., in 80 times its weight of water. A little spirit may be added to help quick drying.

Eosin	2 oz
Gum	2 oz.
Spirit	10 oz.
Distilled water	100 oz.

Dissolve the colour in the spirit with the aid of gentle heat. Then in a separate vessel dissolve the gum in water and filter. Finally heat the gum solution and as soon as it begins to boil pour in the colour solution in a thin stream with continuous stirring.

Whisky.

2497 R. F., Tikamgarh—Wishes to know the composition of whisky.

Fusel oil	6 oz.
Oil of bitter almonds	4 dr.
Oil of coriander	4 dr.
Oil of cade	1 oz.
Guaiacol	2 dr.
Butyric ether	4 oz.
Alcohol	4 oz.

Dissolve 1 oz. of the above mixture in 14 gallons of alcohol. Then add 16 gallons of water. Filter through magnesium carbonate. Colour with caramel.

Toilet Soap.

2684 B. C. S., Raghunathpur—Wants to learn the process of manufacturing toilet soap.

Tallow	10 parts.
Coconut oil	1½ „
Best refined lard	1 part.
Caustic soda lye	q. s.

Melt out the tallow and oils, and pump the mixture into the soap boiling pan. Heat up. When nearly boiling add caustic soda lye of 40° Tw and continue boiling for about 2 hours, until all the oil is saponified (which is known to be the case when no oily specks can be observed floating on the surface of the soap). Then salt out by putting salt over the surface of the boiling mass until the soap is found to have separated from the spent lye, and floats freely on the top of the spent lye. Now run off the spent lye through the stop-cock at the bottom of the soap pan, until the soap commences to flow. The stopcock is then closed. The spent lye which has been run off contains the separated gly-

cerine, which may be recovered afterwards.

Now, boil up the soap again with water to closeness, and gradually run in caustic soda lye of 30° Tw until the residual fatty matter of the previous operation, has been completely saponified.

The addition of caustic soda lye must be made slowly and very cautiously while a steady boil and close observation are in progress, otherwise the soap will contain traces of free alkali, which is objectionable, as the soap must be perfectly neutral. The batch is again boiled for about three hours and again "salted out" as before with a sufficient quantity of salt. To ascertain whether the salt is added in excess, a metallic rod is plunged into the boiling mass and is gently drawn out. If no soap adheres to the rod, then it must be concluded that the salt has already been added in excess and no more is required. Now the pan is removed from the fire and allowed to rest till the next day, when the half-spent lye is drained off through the valve until the soap commences to flow.

The pan is again heated to boiling and water is added over the surface in a steady constant stream until the soap is almost closed. Afterwards pan is carried up and allowed to rest for a day or two. The contents of the pan will then be found in four distinct layers, underneath the surface crust the pure neutral soap constituting the major portion will be found beneath which is the nigre or black soap and underneath it is alkaline water. The pure soap is then run into frames and when cold the stock soap for the manufacture of toilet soap.

The soap is next dried and reduced to powder. The necessary perfume is thoroughly incorporated into the soap powder and then forced through a die plate by heavy pressure forming a long bar which is cut into cakes. These are then stamped and pressed in the desired shape.

Petroleum Jelly.

2969 S. C. M. Lahore.—Desires to learn the process of manufacturing petroleum jelly.

The principal point in the manufacture of vaseline or cosmoline is to free the raw materials, consisting either of natural mineral tar (soft native bitumen) or the residues of petroleum, from all adhering impurities and easily decomposable substances, and to decolorise them at the same time as much as possible. The mineral tar from Alsace and Galicia, and petroleum residues in the United States, are the principal raw materials used. They are of a semi-fluid to pasty consistency, and according to their condition the resulting vaseline will be more or less consistent.

The raw material is cleansed and decolorized by treating it with sulphuric acid and chromate of potassium, and subsequent digesting with animal charcoal. We give in the following a description of the processes used:

The raw materials are converted into a fluid state and passed, after all the soluble substances have been separated, through a series of carbon filters, such as are used in sugar refineries.

After passing through 12 to 15 filters, the originally blackbrown fluid assumes a wine-yellow colour, and by pass-

ing through double the number of filters becomes clear as water. The clear fluid, the specific gravity of which decreases as it becomes lighter in colour, containing now no trace of bituminous substances, is brought into the duplicator, into which superheated steam is passed, the temperature being raised to 480°F. Samples taken occasionally from the boiler must show no changes in the oil after this temperature has been kept up for several hours. The steam is then shut off and the finished vaseline (about 25 to 30 per cent. of the raw material) is filtered through tissue paper and packed in boxes for transport.

The greatest disadvantage of this process is, that the animal charcoal is very rapidly exhausted and is only able to decolorize a small percentage of its own weight of vaseline; expensive arrangements being therefore required to extract the solution adhering to the charcoal and revivifying the latter by means of superheated steam of 750°F to 930°F. But the quality of this vaseline is very good, its colour being a pure white like the best white tallow. It is entirely tasteless, odourless, not only when rubbed upon the hand, but also when melted in water; the latter property distinguishing it from all other varieties of vaseline, which, on melting in water, develop a faint odour of petroleum. Vaseline when melted gives an entirely clear and colourless fluid, recondensing into a homogeneous, non-crystalline mass.

Carbon Rod.

2357 M. U. T., Sialkot City—Wants a process for preparing carbon rod for electric purpose.

As carbon cannot be melted to a fluid condition it cannot be cast in a mould. But powdered carbon can be combined with a cementing substance, made into a stiff paste, then moulded to shape, and baked. When preparing a rod, the carbon is ground to a very fine powder. It may then be made into a paste by adding sugar syrup or treacle. This paste is next pressed into a strong iron mould, so made as to be easily taken apart afterwards for the removal of the carbon article. The mould with its carbon must then be baked at a strong bright, red heat, which will carbonise the sugar and cement the powdered carbon. It may be necessary to soak the carbon again in sugar syrup, and rebake until sufficiently smooth and hard.

Motor Car Hoods.

To render the fabric water-repellent it is usually treated with a fat dissolved in a volatile solvent, e.g., wool fat in benzin. In some cases an aeroplane 'dope' may be applied, which produces a satisfactory result provided the hood is not folded. The following is a suitable formula:—

Cellulose acetate	66 parts.
Tetrachlorethane	440 "
Carbon tetrachloride	120 "
Acetone	240 "
Alcohol	200 "

Brahmi Oil.

2626 J. M. D., Bombay—Desires to know the process of preparing brahmi oil.

In preparing this medicated oil, sesame oil is generally used. This oil, before being boiled with medicinal sub-

stances is first of all heated to deprive it of any water by evaporating. It is then purified by steeping in it the following substances for 24 hours viz., madder 1/16 part in weight of oil, turmeric, wood of *symplocos racemosa*, tubers of *cyperus rotundus*, a bark called nilaka, the three myrobalans, root of *pavonia odorator* and the tender shoots of *Pandanus odoratisium*, each one sixty-fourth part in weight of the oil. These ingredients in fine powder should be soaked in the oil, with the addition of an equal quantity of water for a day. The mixture should then be boiled till the water is evaporated, and finally strained through clean cloth. To the oil thus prepared dried brahmi herb is added in the proportion of 4 parts of the herb to 16 parts of oil. The mixture is then boiled till the watery parts are all evaporated. This is then allowed to cool and strained.

Mouse Exterminator.

3133 P. I. H., Rawalpindi—Desires to know the formulas for preparing mouse exterminator and office paste.

Barium carbonate	100 parts.
Oatmeal	300 "
Saccharin	1 part.
Water	q.s.

Make a stiff dough, force through a coarse sieve, and dry in an oven.

Office Paste.

Allow 4 parts by weight of hard gelatine to soften in 15 parts of water for several hours, and then moderately heat until the solution is quite clear, when 65 parts of boiling water should be added while stirring. Stir, in another vessel, 30 parts of starch paste with 20 of cold

water, so that a thin milky fluid is obtained, without lumps. Into this the boiling gelatine solution should be poured while constantly stirring, and the whole kept at a boiling temperature. When cool add to the whole 10 drops of carbolic acid to prevent souring. This makes a very tenacious paste.

Laxative Sugar.

3167 C. L., Phagwara—Wishes to have a recipe for preparing laxative sugar.

Refined sugar	52	parts.
Senna	16	"
Liquorice root	16	"
Fennel fruit	8	"
Sublimed sulphur	8	"

Mix in fine powder and keep in bottles. Dose: 60 to 120 grains. It is a mild cathartic.

Camphor Cubes.

2779 R. R. B., Amritsar—Wants a process of making camphor cubes and also process of manufacturing imitation diamonds.

To make camphor cubes take camphor in powder and sprinkle a small quantity of alcohol over it. Then press it in mould of desired size. When the alcohol evaporates, take out the cakes.

Imitation Diamonds.

Imitation diamonds are plenty enough and in their fabrication considerable skill is often displayed, and the imitation is at times so very cleverly done that real diamonds seem to be eventually

manufactured. Hitherto though chemists have had no difficulty in discovering of what diamonds were composed, they have never succeeded in producing them. Diamonds are chemically the same as charcoal, and they may be readily converted into it, but the more satisfactory transmutation of charcoal into diamonds proved a most tantalizing mystery. At last we hear of the secret being discovered. The process is simply this: If a current of chlorine gas prepared by the action of manganese dioxide or potash permanganate on hydrochloric acid be made to pass through cast iron, when in a state of fusion, perchloride of iron is formed, which disappears by evaporation, leaving the carbon of the metal at liberty in a crystallised state, forming either black, colourless or coloured diamonds.

Pan Pills.

2819 S. A., Ghatkopar—Desires to have recipes for preparing pan pills, fruit salt, etc.

Cardamom	100	parts.
Cloves	100	"
Cinnamon	100	"
Nutmeg	100	"
Mace	100	"
Cubeb	100	"
Catechu	100	"
Camphor	10	"
Musk	1	part.

Take the ingredients in fine powder and mix thoroughly. Put all the substances together in a mortar and make it a stiff paste with rose water. Bray well for some time. Take this and make it into small pills of 2 to 3 grams each and allow to dry in shade.

Fruit Salt.

The following is a popular substitute for the well-known Eno's fruit salt. But the word "fruit salt" being a trade mark cannot be used however

Tartaric acid	2 parts.
Sodium Bicarbonate	2 "
Magnesium sulphate	1 part.
Potassium bitartrate	2 parts.
Magnesium citrate	2 "
White sugar	4 "

Powder the ingredients separately and mix.

Glucose.

Liquid glucose is a viscid syrup known as "starch syrup" obtained by the incomplete hydrolysis of starch consisting chiefly of dextrose and dextrines. 200 parts by weight of water and as much sulphuric acid as serves to make a 0.3 per cent. solution are placed in leadlined vessel, and 100 parts by weight of starch (weighed dry) made into a milk with water are run into the boiling acid, so that the starch is almost immediately gelatinised. The mixture is then heated in a copper autoclave for one hour under 1 atmosphere pressure, so that about half of the starch is hydrolysed to dextrine and the rest to dextrose (or maltose). The process is finished when a test portion gives no coloration with iodine—showing that all the starch has disappeared. The product is a non-crystallisable syrup having a density of 17°Be. The sulphuric acid is neutralised with calcium carbonate, the solution filtered from the calcium sulphate, through a filter-press, evaporated to 32°Be in a vacuum pan, again filtered from precipitated calcium sulphate, through a filter-press, and finally decolorised by filtering through animal charcoal, which simultaneously absorbs some of the finer particles of calcium sulphate. The syrup is now again concentrated in vacuum pans to 42°—45°Be and should be clear and colourless. To prepare it, take moist pota-

to starch, carefully purified from nitrogenous matter as the presence of which yields a dark product.

Lemon Squash.

2867 R. N. S., Bombay—Wants to know the process of preparing lemon squash.

Tincture of lemon peel	4 oz.
Oil of lemon	½ oz.
Rectified spirit	2 oz.

Shake well and after standing for a few hours draw off the clear tincture from the oil. Add

Tartaric acid	2 oz.
Syrup to make	1 gallon.

Lastly, colour the fluid with tincture of saffron 1 dram and caramel a sufficiency.

Orange squash may be prepared in the above manner by substituting tincture of lemon peel and oil of lemon with tincture of orange peel and oil of orange. Their proportions however remain unchanged.

Bar Soap.

2891 H. L. B., Poona—Desires to know a process of manufacturing bar soap.

Raw tallow	60	Seers.
Mahua oil	30	"
Punang oil	10	"
Caustic soda lye 36°Be	50	"

Put the tallow in a suitable pan and apply gentle heat so as to melt it. Then remove the fire and slowly add half of the lye with continuous stirring. Then boil until saponified. This boiling goes on for 2 full days in the course of which the other oils are added and more of the caustic and caustic lye. Sufficiently more caustic soda is taken which settles at the bottom when the boiling is finished. Soap is allowed to rest overnight and the upper layer is removed to another pan next morning where it is paddled and dried and cut into bars.

READER'S BUSINESS PROBLEMS

[Reader's business problems will be discussed in these pages. We invite the reader to write us his difficulties. As the department is in charge of an experienced businessman who is specially adept in dealing with such problems and to whom experiences of a large number of successful business men are available, his replies will lead the enquirer to a successful career. These replies will be published in the paper only and cannot be communicated by post.]

Net Profit in a Business.

2942 B. K. D., Bombay—I have a small shop in Bombay, average sale of which is fairly good. After a year I find that instead of making profits a portion of my capital has sunk. Will you please explain the cause of this?

Success of a small shop depends on various factors the most important of which is net profits made by any shop-keeper. So in order to ensure permanence of your business you should always remember that you will not sacrifice profit to volume.

Every now and then we find thousands of little shop-keepers start with a few hundred rupees. They know nothing about salesmanship or window display. Their one idea is that they must sell on price. If they buy articles for 6 annas a piece and sell them for 7 annas a piece they think that they have made a profit. They do not know that their expenses are 20 per cent. At the end of a couple of years, they find that they have been working for nothing and that they have lost their capital. They were never really in business at all. They only thought they were. They did not know the meaning of the word 'business'.

From the above it is clear that if your expenses are 20 per cent. and if you buy an article for 6 annas and sell it for 7 annas you make no profit at all. So in order to be a successful businessman you

must sell it for $8\frac{1}{2}$ annas. Thus from this transaction you make one anna profit. But at the same time you should take care that your price does not exceed the price of your competitors. The one vital point in every business is the percentage of net profit.

Starting a New Business.

3303 I. S. B., Meerut Cantt—I wish to start some business. Will you please instruct me so that I may be successful in my attempt?

In starting a new business, some experience under proper guidance is a great advantage but this is not possible and the man is left to his own resources and initiative and must gather his experiences as he goes along. In engineering and legal professions you will find chances for apprenticeship but in purely commercial line you will not find any firm taking apprentices. As you have made up your mind to start a business you should first of all thoroughly study yourself and find out for which particular line you are fitted. For this purpose you should consider the following items: Your own natural inclinations, educational qualifications, amount of capital at your disposal and friends and acquaintances likely to be of help to you. Now you will find out if possible some firm where you can get yourself apprenticed with or without pay or if necessary on payment of a premium,

and learn the business you intend to start, in all its practical aspects. If not, you would act wisely in going around, spending a shorter or larger time in one situation, then sometime in another, until experience in different places with different employes rounded off corners and expanded trade knowledge. Now you should select a proper site and it is important that the premises chosen should offer facilities for expansion when due time arrives.

In these days of competition and price cutting, the buying of goods, and of labour are the foundation upon which selling prices are built, upon which the profits are computed and the success of the whole concern depends. Next after buying comes the proposition the sale of goods bought. The salesman must be frank and enthusiastic. By his enthusiasm he must attract the interest and sympathy and finally the business of those before whom he places a proposition. It is easy for any one to sell something the buyer wants; but the test of salesmanship is to sell a man what he did not think he wanted. When something not in stock is required you must induce the enquirer to see sample of other sorts of similar stuff. You must discover an unsuspected want or must engender a new want in the mind of your customer. In doing so you must be courteous and ever obliging, but must never be over zealous.

The stock should be verified and examined very carefully at regular intervals. It is an important part for every businessman as on stock counting you will be able to ascertain the amount of profit you make.

In these days of hard competition the customers must be attracted into your shop. You should devise new ways, alter the display of your windows con-

stantly that may force the eyes of even passersby to look at. You must study the taste of your customers. You may place gramophone or radio set in your window to draw attraction and we know how a crowd is always collected when the machine goes on.

Aerated Water Factory.

2562 R. L. J., Jubbulpore—I live in a fairly big town having several hotels and quite a number of European and Anglo-Indian residents. The Indian residents of the town also purchase a large number of soda waters and other kinds of aerated waters. Do you advise me to open an aerated water factory here?

Yes, you may start an aerated water factory in your town and the sooner it is done the better. Before actually starting the factory we would also advise you to see carefully how other manufacturers manufacture aerated waters in some of the first class factories so that you can make equally good stuff, if not better in your own. This is not at all a difficult problem to solve, as we see men with little or no education or experience turning out very good stuff. You must take care to have your labels printed in an attractive form and keep everything in your factory scrupulously neat and clean, the water used being of course filtered. You should at first supply the aerated water at less than the existing rates. If your quality be not inferior to other articles sold in the market there is no reason why you will not be able to capture the entire market within a short time. We would also ask you to see the hotel keepers and various clubs and convince them to stock your goods. You should also distribute printed handbills to your Indian fellow townsmen, soliciting their patronage and informing them of your reduced rates and excellence of quality.

tity of oil in a glass beaker and then surround the bottom of the vessel with a mixture of ice and salt. As the temperature of the oil diminishes crystals of menthol collect at the bottom of the vessel and are then taken out. Then press them in folds of blotting paper and keep in air-tight bottles. You may also consult *Cocoa and Chocolate Industry* by A. W. Knapp. (3) A good formula of hair dye will be found in January, 1934, issue of *Industry*. (4) For the chemical write to B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta. (5) Melt the resin with a little oil and finally mix with the soap. (6) *Guide to Small Scale Industries* by M. C. Mohan may be had of Students Own Agency, Anarkali, Lahore.

3200 T. S. H., Jalalpur Jattan—You may consult the following books: *Confectioner's Raw Materials* by J. Grant and *Complete Confectioner* by Skuse. Both the books may be had of W. & G. Foyle Ltd., 119-125, Charing Cross Road, London W. C. 2.

3201 M. I. M. K. B., Colombo—For brass articles you may enquire of W. Leslie & Co., 19, Chowringhee Road and Civil & Sanitary Engineering Co. Ltd., 4, Convent Road; both of Calcutta.

3202 E. I. E. F., Srinagar—Following is a list of shipping agents: Eastern Trading Co., Bunder Road, Karachi; Landing & Shipping Office, Native Jetty and Premier Shipping & Clearing Co., Bunder Road; all of Karachi.

3204 P. P. M., Bundelkhand—You may start knitting industry in which line you have some experience and you have a knitting machine.

3206 R. S. I. P., Sind—You may start some profitable industries such as soap manufacture, perfumery industry, candle making, wheat flour making, pen and pen holder making, celluloid articles, oil milling, etc.

3208 S. S. S., Jafna—Process of manufacturing imitation silver will be found in May, 1934, issue of *Industry*.

3209 G. P., Bombay—Righthanded 'shunk' is a very rare thing it is not available in the market for sale.

3211 K. B. A. B., Guntur—(1) There is no institute where bakery is taught. (2) You may start a bakery with Rs. 5,000

3212 M. Y. E., Bantva—(1) Cigars are manufactured by T. S. Rangam & Co., Trichinopoly and Thavanas Syndicate, Worliur, Trichinopoly and T. M. Sundaram Pillai, Palakarai, Trichinopoly. (2) Catechu may be had of India Wood Products Co. Ltd., Izatnagar, Bareilly and Uravakuda Chandra Bandeappa Out-Agency, Uravakonda, Ganjam. (3) All the chemicals you require may be had of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane and Bengal Chemical & Pharmaceutical Works Ltd., 31, Chittaranjan Avenue, Calcutta.

3215 C. I. M. A., Nairobi—(1) Yes, you may manufacture self-opening paper bags. For this purpose you have to use machines. Machines may be had of Oriental Machinery Supplying Agency Ltd., 20, Lall Bazar Street, Calcutta. (2) For manufacturing hurricane lantern you have to use sheet metal working machine which may be supplied by Taylor & Challen Ltd., Birmingham, England. (3) Other industries referred to by you are mostly mechanical and can be started with the help of some machines. These industries do not involve any technicalities. You have to work the machine according to the directions given by machine manufacturers. If you find any difficulty in manufacturing the articles please write us when we shall supply you further instruction for your guidance.

3216 Y. B. P., Savantwadi—Process of utilizing used rubber tyre and tubes will be found in December, 1934, issue of *Industry* under the caption of Rubber Industry.

3217 N. R., Bagar—(1) We generally publish answers of industrial and commercial questions in our journal. (2) In special cases some questions are replied by post on receipt of 4 as. stamp for each question. (3) Refer your query to Jardine Skinner & Co., 4, Clive Row and Mackinnon Mackenzie & Co., 16, Strand Road; both of Calcutta. (4) For passport write to the District Officer. (5) You may communicate with the Consul-General for Japan, 26-27, Dalhousie Square, Calcutta. (6) Various chambers of commerce safeguard the interest of the commercial community and give expression to their grievances to the Government of India and the Provincial Governments as well. One of the most important functions they have to perform is to express their opinion on the various measures adopted by the Government as are likely to wield considerable influence over the commercial industrial and economic developments of the country. (7) Indian Trade Commissioner in London will reply questions regarding Indian trade in Great Britain. (8) For samples you may write direct to the parties. Yes, you have to pay import duty on the goods brought from foreign countries. (9) Manufacturers will

WE MANUFACTURE.

Turkey Red Oil 50 %

Turkey Red Oil 42-45 %

Monopole Soap

Competitive Prices, Highly Spoken of by users

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SCIENTIFIC PRODUCTS CO.,

6, Kirti Mitter Lane, Shambazar, Calcutta.

need not add any colouring matter. Separately crush the each ingredient, sift, mix thoroughly add water then burn in the kiln; 800°C signifies the temperature of the kiln. Hindi equivalent of gypsum is sufed pathar and Gujrati equivalent is gabhana.

3240 J. S. J. S., Amritsar—Your may bleach the rape oil according to the following process: The oil is first agitated with water containing gum, and to the emulsion thus formed is added coarsely crushed wood charcoal, the whole is then slowly warmed to a degree not reaching 212°F and when cold the oil is dissolved out by ether or petroleum spirits and the latter is recovered by distillation; the result is good.

3241 H. L., Bombay—Objectionable odours in oils may be eliminated by passing low pressure steam through them in the following way. Take a metal vessel through the top of which enter a metal pipe and terminate just above the bottom of the can with perforated branches. The other end of the pipe is connected to a steam boiler. Now pour the oil to be deodorised into the vessel and slowly allow steam to bubble through it for several hours. After this the oil is separated from water and passed through charcoal filter, when almost odourless oil is obtained.

3242 B. T. C., Jalalpur Kiknan—To prepare white cement stir 25 parts of infusorial earth free from iron and chalk, into a solution of 2.5 parts of potash or soda and form the mass into bricks, which are dried, burnt in a white heat and then ground.

3246 S. K. Pilibhit—(1) Wants to be put in touch with manufacturers of wickers and cane folding furniture in foreign countries. (2) Refer your query to the Agricultural Department of the Bombay Presidency. (3) Following is a list of cane and wicker furniture merchants: Calcutta Blind School Furniture Stall, 36E, Hogg Market, Calcutta; Punicheong & Co., 2, Lindsay Street, Calcutta; Samsuddin Bakshoobhoy Netterwala & Co., 375, Katha Bazar, Bombay and Moolchand Phus ki Seraj, Delhi. (4) Following is a list of journals dealing with agriculture—Agriculture & Livestock in India, 3, Govt. Place

West, Calcutta; Planters Journal and Agriculturist, 13, Ezra Mansion, Calcutta; Poona Agricultural College Magazine, Poona.

3247 Y. K. P., Ramachandrapur—Rice root is not collective name for a group of herbs as suggested by you. It is the root of rice plant and is not exported abroad.

3249 P. S., Mangalagiri—Refer your query to The Bombay Millowners' Association, Patel House, Church Street, Fort, Bombay. For machineries you may write to W. H. Brady & Co. Ltd., Churchgate Street, Bombay. You may start hosiery industry, pottery, hydrogenation of fats and oils, etc.

3251 S. S. A., Molwan—(1) Manganese dioxide may be had of Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane, Calcutta (2) For zinc and ammonia chloride write to B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta. (3) Graphite may be had of Indian Graphite Mining Co., 5, Pollock Street, Calcutta. (4) Zinc sheets, brass strips and brass capping may be had of Gopal Chandra Dass & Co. Ltd., 86A, Clive Street, Calcutta. (5) Carbon rod may be had of Balmer Lawrie & Co. Ltd., 103, Clive Street, Calcutta. (6) Appliances may be had of Industrial Machinery Co., 14, Clive Street, Calcutta.

3252 J. C. K., Changanacherry—For selling rubber you should communicate with India Rubber Goods Manufacturing Co., 47, Muraripukur Road, Manicktala, Calcutta and United Rubber Works, Tiljala Road, Calcutta.

3253 B. L. B., Calcutta—(1) Real rubber may be had of Central Travancore Rubber Co. Ltd., Mundakayam, Ernakulam, Travancore; Malankara Rubber & Produce Co. Ltd., Thodupuzha, Travancore and Munjamullay Tea & Rubber Estate, Travancore. (2) If you wish to manufacture rubber canvas shoes you have to invest at least Rs. 25,000. (3) Rubber goods are manufactured by Bhattacharyya Rubber Works, 18, Sura East Road, Belegkata, Calcutta; Bengal Waterproof Works, 2, Nazarali Lane, Ballygunge, Calcutta. and India Rubber Goods Manufacturing Co., 47, Murari Pukur Road, Manicktala, Calcutta.

3254 D. N. R., Hospet—A formula of lemon cream will appear in an early issue of Industry.

3255 K. P. R., Rajahmundry—For selling used postage stamps you may negotiate with D. Field, 7, Vigo Street, London W; Healey & Wise Ltd, 14, Warmwood, London E. C. 2 and G. W. Saunders Ltd, 57-59, Ludgate Hill, London E. C. 4.

3258 B. Y. R. B., Belgaum—Electrical machines may be supplied by E. Akioka Machinery Co., 41, Tanimachi 6-Chome, Minami-ku, Osaka, Japan and Ohnishi Spring Works, 739, Motoomachi 1-Chome, Naniwaku, Osaka Japan.

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Sole Agents: **THE PUROID PRODUCTS Ltd.,**
Post Box 2092, Bombay.

3262 U. A., Colombo—(1) It is very difficult on our part to suggest names of parties who sell their goods through agents. We however supply you with a list of firms as desired by you. (2) Khaddar cloths and shirtings may be had of Khadi Bhandar, 396, Kalbadevi Road, Bombay 2; Khadi Pratisthan, 15, College Square Calcutta and Khadi Vastralaya, Esplanade, Madras. (3) Silk saris may be had of Bengal Silk Mills, 13, Ariff Road, Ultadanga, Calcutta; Silk Weaving Factory, 12, Bag Sunderdas, Benares and Tata Silk Farm, Basavangudi, Bangalore City. (4) Woollen piece-goods and other piece-goods may be had of Bird & Co., Chartered Bank Bldgs., Clive Street, Calcutta; Grahams Trading Co., 9, Clive Street, Calcutta; R. S. Kapur & Co., Near Town Hall, Amritsar; Kettlewell Bullen & Co. Ltd., 21, Strand Road, Calcutta; Maniklal Balabhai & Co., 26, Hummum Street, Fort, Bombay; S. H. Badsha Sahib & Co., 52, Angappa Naick Street, G. T. Madras and Harkisandas Manilal & Co., Saucha Galli, Mulji Jetha Market, Bombay. (5) For money purses write to Century Leather Co., Purwa Hiranman, Cawnpore; Dewan Chand & Sons, 218, Harrison Road, Calcutta; Ideal Leather Works, 60-10A, Harrison Road, Calcutta. and Fine Leather Art Co., Beconganj, Cawnpore. (6) A list of insurance companies will be found in Industry Year Book and Directory published from this Office. (7) You may also consult Insurance Year Book to be had of Government of India Central Publication Depot, 8, Hastings Street, Calcutta. If you go through the book you will find particulars of the insurance companies you require.

3264 N. P. D. S., Colombo—Process of blue printing on cotton will be found in October 1934, issue of Industry

3265 T. N. K. T., Nilambur—(1) For preserving fruit juices you may try potassium metabisulphate solution. (2) You should use double refined sugar for preserving fruit juices. (3) Yes you may use boric acid for making cordials of fruit juices.

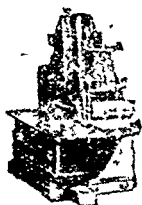
3266 R. L., Dehra Dun—You may consult Indian, Materia Medica by K. M. Nadkarni to

be had of the author whose address is P. O. Box 3558, Bombay.

3267 S. C. B., Digapahandy—There is no such institution in Calcutta where watch repairing is taught. You may send your son as an apprentice in a watch repairing shop.

3269 B. P., Jhind—Defect is due to non-combination of oil and lime water. Perhaps you have not been able to make lime water successfully. For making lime water add 1/10 gr. lime on 110 drops of water.

3270 R. N. S., Dehra Dun—(1) Process of frosting glass follows: Cover the glass with a layer of wax or of varnish on which the designs are traced with a graver or pen-point; next hydrofluoric acid is poured on the tracings. This acid is very dangerous to handle for this reason it is better to proceed in the manner as directed below, which does not present this drawback: Take powdered flouride of lime 1 part, and sulphuric acid 2 parts. Make a homogeneous paste, which is spread on the parts to be frosted. At the end of 3 or 4 hours wash with water to remove the acid, next with alcohol to take off the varnish, or with spirit of turpentine if wax has been employed for stopping off. (2) Kerosine oil may be had of Anglo-Persian Oil Co. (India) Ltd., Hongkong Bank Bldgs., Calcutta; Victor Oil Co. Ltd., 11, Clive Street, Calcutta and Tide Water Oil Co. (India) Ltd., 8, Clive Row, Calcutta. (3) Following is a recipe of motor grease: Mutton fat 2 cwt; palm oil 2 cwt; soda crystals 1 cwt; water 70 gallons. Dissolve the soda in water by boiling, and allow to stand until cold. Melt the fat and palm oil in a pan by heating over a fire and when all is melted mix the soda water well and run it off through a fine strainer into a wooden trough. (4) Rosin is known as rajan in vernacular. (5) For preparing rosin soap take rosin 10 sr., caustic soda 1.5 sr. and water 9 srs. Take rosin and some water and apply heat; now make a solution of caustic soda by dissolving it in water. Add to the rosin and heat until completely saponified. (6) Leather may be had of



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Upper India Commercial Leather Co., Misri Bazar, Cawnpore and A. M. Rasul & Sons, Lyallpur, Punjab. (7) You may enquire of Imperial Typewriter Agency, 5, Dalhousie Square, Calcutta. (8) For chaff cutting machines you may enquire of T. E. Thomson & Co., 9, Esplanade East, Calcutta. (9) In manufacturing ink blue vitriol is not used but ferrous sulphate is used instead. (10) You may negotiate with Banshidhar Dutt & Sons, 126, Khen-grapatty, Barrabazar, Calcutta for Himalayan herbs. (11) Punjab Portland Cement Works, Wah, Attock, manufacture cement.

3271 R. T. C., Bombay—Your enquiry being in the nature of an advertisement should not be published in Trade Enquiries Columns. Your name has been entered in our reference book.

3272 G. F. Moulmein—For selling rubber you may negotiate with India Rubber Goods Manufacturing Co., 47, Muraripukur Road, Manicktala, Calcutta; Bata Shoe Factory, Konnagar, E. I. Ry. and United Rubber Works, Tiljala Road, Calcutta. For selling rubber in foreign countries you may write to Indian Trade Commissioner, India House, Aldwych, London W. C.

3273 J. P. J., Dehra Dun—For castor cake you may enquire of Naraindass Luchmandass, Raipurva, Nayaganj, Cawnpore and Matadin Bhagwan Das, Bansmandi, Cawnpore.

3276 P. N. D., Lyallpur—(1) You may communicate with the following parties for enlarging photos: D. Ratan & Co., 22-1, Cornwallis Street, Calcutta; Sen's Studio, 183, Dharamtala Street, Calcutta; Hamilton Studios Ltd., Graham Road, Ballard Estate, Bombay and Universal Photo Enlarging Co., 519, Kalbadevi Road, Bombay. (2) Following is a good recipe of ink: Tannic acid 2½ oz.; gallic acid ½ oz.; ferrous sulphate 3 oz.; hydrochloric acid (dilute) 2½ fl. oz., carbolic acid 75 grs.; methyl blue ½ oz. distilled water to produce 5 pints. Dissolve the tannic acid and gallic acids in about 5 oz. of warm water. Cool. Dissolve the ferrous sulphate in about 15 oz. of cold water. Add the hydrochloric acid and immediately mix the two solutions. Add the carbolic acid, methyl blue and sufficient water to make 8 pints. (3) A good formula

of shaving soap will be found in November 1933 issue of Industry. (4) Formulas of sealing wax will be found in June 1934, issue of Industry. (5) Process of making corn flour will appear in an early issue of Industry.

3277 P. M., Darbhanga—(1) Following is a good recipe of compound perfume for hair oil: Rose geranium oil 6 oz.; lemon oil 5 oz.; cassia oil 2½ oz.; orange oil 2½ oz. Mix. Use 75 minims for perfuming every pound of vegetable oil. It is not possible to perfume hair oil with only one or two scents. First refine the oil thoroughly then add the scent. Process of deodorising coconut oil will be found in January 1935, issue of Industry. You may follow the same process for deodorising other oils also.

3278 K. N. G., Allahabad—Please write clearly your difficulties in working out the formulas when we shall try to solve your difficulties. Greasiness is due to non-saponification of wax.

3280 F. G. S. M., Vellore—(1) The modern method of printing upon tin plates is an application of offset printing. The printing machines may belong to either the flat-bed or the rotary type but they are built for this special purpose and have their own characteristics. The tin plate does not actually come in contact with the printing surface but as it is carried round with the cylinder into which it is fed, it receives an offset impression from a rubber blanket fixed upon a second cylinder which has already taken a direct print from the printing surface. As the plates are printed they are arranged in racks and kept aside to dry or they may be put into a stone for forced drying. Particulars will be found in June 1930 issue of Industry. (2) Tin printing is done by Indian Colour Printing & Hollowwares Ltd., 243, Upper Circular Road, Calcutta and Metal Decorating & Shaping Co. Ltd., 112, Narkeldanga Main Road, Calcutta and Na Kane Kojo, 301, Noe-Cho, 2-Chome, Higashi, nari-ku, Osaka, Japan. (3) Boot polish is manufactured by Alfa-Trading & Manufacturing Co., Cawnpore; Agra Chemical & Pharmaceutical Works, Agra; Banga Luxmi Chemical Works, Ghutia Bazar, Hooghly; Bengal Chemical & Pharmaceutical Works Ltd., 31, Chittaranjan Avenue, Calcutta and Calcutta Chemical Co. Ltd., 35/1, Panditia Road, Ballygunge, Calcutta.

3281 B. V. N., Fornagallu—(1) Soap making materials may be had of Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane, Calcutta. (2) Machines and apparatus may be had of Industrial Machinery Co., 14, Clive Street, Calcutta. (3) In making soap you may use soft tallow for mohua oil. (4) In making fly paper you should use manilla paper.

3282 S. I., Rajnandgaon—It is not possible to make toys of porcelain so easily. You better

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try to make toys of earth and apply glazes on them. You may also try to be an apprentice in a concern manufacturing toys. You may read some literature on the subject which may be had of Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

3287 R. K. N., Kottayam—For supplying tapioca flour, pepper and dry ginger you may negotiate with Banshidhar Dutt & Sons, 126, Khengrapatty, Barrabazar, Calcutta.

3288 G. M. R., Puri—For rope making machines you may enquire of Mitsubishi Shoji Kaisha Ltd., 135, Canning Street, Calcutta.

3289 D. S., Rohtak—(1) You cannot make good soap with artificial tallow. (2) You may use mohua oil and coconut oil. (3) Strength of caustic soda 76/77 p.c. is same as that of caustic soda of 93 p.c. so you should use the same quantity of caustic soda. (4) Following is a recipe of lice killer: Borax 3 oz.; glycerine 4 oz.; decoction of cassia (1 in 5) 60 oz. Dissolve the borax in the decoction of cassia and then add the glycerine. Apply once daily.

3290 R. N. S., Pili—For hand-spun woollen yarn you may write to All India Spinners' Association, Kashmir Branch, Srinagar, Kashmir.

3291 S. S. A. B., Teruvendipuram—After adding mercury and sulphur further heat the whole so that the mass becomes of red colour. Now grind the whole to form powder.

3295 V. S., Damoh—(1) After the honey is passed from the comb, strain it through a sieve, so as to get out all the wax; gently boil it, and skim off the whitest foam which rises to the surface, then the honey will become perfectly clear. The vessel for boiling should be earthen brass or tin. The honey must be kept in jars when cool, and tightly covered. (2) Vermicelli is made from fine wheat flour and is thread-like while macaroni is made of sooji and is tube-like. These are made with the help of machineries. (3) Vacuum packing and vermicelli making machines may be had of Oriental Machinery Supply Co. Ltd., 20, Lall Bazar Street, Calcutta.

3299 A. I., Bombay—(1) Soak the glue in water, then melt it at a moderate heat, and add strong vinegar until the solution remains a thick fluid when cool. Add a small quantity of

acetic or nitric acid, which will keep it fluid at an ordinary temperature until the acid evaporates. (2) Formula of rat exterminator appears elsewhere in this issue.

3301 L. C. B., Ludhiana—(1) No other process of manufacturing camphor except one under query reply No. 2462 of December 1934, issue of Industry is available. Straw is to be placed inside the dome which is a semi-circular convex. (2) The addresses of Camphor manufacturers, and camphor wood importers are not known. (3) A recipe of agarbatti follows:—Gum olibanum 20 dr.; Gumbenzoin 6 dr.; Cascarilla bark 5 dr.; Cloves 2 dr.; Cassia 2 dr. Mix and grind. (4) Preparation of alum slab appears elsewhere in this issue. (5) Crucible making appeared in October, 1934, issue of Industry.

3302 S. H., Landikotal—(1) The following is a recipe of cork composition: Shellac 12 parts; oil turpentine 14 parts; chalk powder 7 parts; pine resin 12 parts; lamp black 2 parts; bone black 2 parts; asphaltum 2 parts. Melt the shellac, asphaltum and rosin in a large copper vessel, then pour the turpentine cautiously into it so that it may not catch fire. Afterwards add the remaining ingredients and incorporate thoroughly. (2) An elaborate article on dry battery manufacture appeared in May, 1934, issue of Industry. (3) For button making go through "Guide to Small-Scale Industries" by M. C. Mohan B.A., price Re. 1/8/- only, published by Ram Lal Suri, Anarkali, Lahore.

5303 I. S. B., Meerut Cantt—Yes, a query accompanied by 4 a.s. stamp is replied to by post. (2) Regarding the selection of business you want to undertake, it is not easy to say what would suit you best. The success depends upon the capacity, resources, perseverance and luck of the doer with reference to the market and environments. You are advised to go through our journal and other industrial books and after considering the nature of the market fully well select your line yourself.

3304 U. S. S., Budaun—(1) Morabba of Salab Misri is not known. It may be a preparation having salim misri as one of the chief constituents. (2) The following is a recipe of tooth powder that prevents bleeding of the gum and



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is good for all purposes: Prepared chalk 100 parts; kino 25, catechu 25 parts, charcoal 25 parts; soap powder 10 parts; menthol 2 parts; eucalyptus oil 2 parts, rose geranium 2 parts. (3) Cheap washing soap Coconut oil 24 seers, caustic soda lye at 33°B 17½ seers; soda silicate 2 seers: diluted with hot water 2 seers. Following cold process mix the lye with the oil by stirring briskly and when the mass thickens add the silicate and after mixing well frame.

3305 C. S., Bangalore—Collapsible tubes for tooth paste may be had of Messrs Shah & Co., 55, Ezra Street, Calcutta.

3306 V. & C., Cocanada—(1) Wants to buy English vegetables: (2) Indian fruits and raisins may be supplied by Afghanistan Fruit Agency, Quetta; Gokaldas Tarachand & Sons, Circular Road, Quetta; Abdul Sathar Sriram Lakshmiah, Pallikonda, N. Arcot (Mango); Kona Krishna Rao, Narsapatnam Road; Vizag. (Orange); Hindusthan Fruit Preserving Co. Ltd., Malda, (Mango); Sahibzada Sayed Kalla Nizamat, Murshidabad, (mango); Avatar Nursery, Naya Nagar, Rusera, Darbhanga; Maharaj Garden Nursery, Dhab Kothii, Rusera, Darbhanga.

3307 P. C. Tuticorin—Slate, slate goods, slate pencils and other slates are manufactured by Messrs. Henbeck, Gabruder, 47, Rollner Str; Nurnberg; Messrs. Matthai Bernhard, Steinach, Thur. Wald; both of Germany.

3308 S. C. K., Amritsar—Collapsible tubes for tooth paste may be supplied by Messrs. Shah & Co., 55, Ezra Street, Calcutta; Messrs. Cheswright & Nicholls Ltd., Norway Wharf, Commercial Road, London E.

3309 M. H. H., Porbandar—Mantle knitting machine may be had of Indo-Swiss Trading Co, 2, Church Lane, Calcutta. The full process of mantle manufacture appeared in June, 1933, issue of Industry.

3310 G. H. E., Rangoon—(1) Block making has been fully dealt with in "Independent Career for the Young" price Rs. 1/8/- only, published from this Office. (2) Transfer pictures may be had of Huber Jordan & Koerner Nurnberg; Urban Karl, Brandenburg (Havel), both of Germany; R. Bhattacharya & Co., 158, Mukhtar Babu Street, Calcutta. (3) Tobacco for Beedi may be supplied by Mulji Sikha & Co., 51, Ezra Street, Calcutta; Bhailal Bhikhabhai & Co., 99/2, Lower Chitpore Road, Calcutta

3311 H., Bombay—(1) Manufacture of jelly has been fully dealt with in "Indian Pickles, Chutneys and Morabbas" price Rs. 1/8/- only, published from this Office. (2) Tooth paste may be better preserved by substituting glycerine for water. (3) Refining and manufacture of white crystalline cane sugar will be found in "Sugar in India" by H. H. Ghosh, price Rs. 3/8/- only, published from this Office. (4) The following are a few sugar factories of India. A detailed list may be found in Industry Year Book and Directory:—Bengal Sugar Mills Ltd., Gopalpur, Rajshahi; Oriental Sugar Works Ltd., Majdia, Murshidabad; Bihar Sugar Works, Pachrukhi, Saran; Harinagar Sugar Mills Ltd., Ramnagar, Champaran; Maharashtra Sugar Mills Ltd., Belapur Road, Ahmednagar; Shahmaw Sugar Factory of the Burmah Sugar Co. Ltd., Shahmaw Myt Kyina; Travancore Sugar Mills Ltd., Thuckalay, Trivandrum; Etikoppaka Sugar Factory, Etikoppaka, Vizagapatam; Hospet Sugar Mills Ltd., Hospet, Bellary; Amritsar Sugar Mills Co. Ltd., Amritsar; Shree Guru Arjunde Sugar Mills, Butari, Amritsar; Basti Sugar Mills Co. Ltd., Basti; Hindusthan Sugar Mills, Golagokarnath, Khéri, etc.

3312 K. R., Vaddur—(1) Please write to those American Kerosene Oil Companies direct for their Indian agents. (2) About Russian Kerosene enquire of Messrs. Birla Brothers, 8/1, Exchange Place, Calcutta; Messrs. Western Indian Oil Distributing Co, Aminchand Bldg., Ballard Estate, Bombay. (3) Addresses of foreign directories: Sell's National Directory and British Exporters' Register price 12s. 6d published by Business Dictionaries Ltd., 8 & 9, Johnson's Court Fleet Street, London E. C. 4, England; W. E. Z. Export Directory of German Manufacturers Published by Verlagsanstalt Des, Leipziger, Messamts G. m. b. H., 6, Liebig Strasse, Post Office Box No. 285, Germany. The Osaka Trade Index, The Osaka, Commercial Museum, Japan; American Trade Directory: The National Association of Manufacturers, 30, Church St., New York, America. Indian directories: Thacker's Indian Directory, Thacker's Press & Directories Ltd., Calcutta; Industry Year Book & Directory, published from this Office. The Indian Mercantile Directory Laxmi-

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chand Dossabhai & Bros., Rajkot, Kathiawar; The Business Directory of India, Burma & Ceylon, The Kanara Press, Madras; Cochin & Alleppey Trade and General Directory, Malabar Herald Office, Cochin (4 & 5) Fertilizers: Asano Bussan Co. Ltd., Osaka Branch, Yamaguchi Building, Kawaramachi 2-Chome, Higashiku, Osaka; Atka & Co. Ltd., 14, Imabashi 5-Chome, Higashiku, Osaka, Japan; Bentley Joseph Ltd., Barrow-on-Humber Lines; Butts H. A. & Son, Coronation House, 4, Lloyds Avenue, London E. C. 3, England. Please write to them direct about their Indian agents. (6) About petroleum industry the following book may be recommended: *Hand Book of the Petroleum Industry* by D. T. Day & others to be had of W. & G. Foyle Ltd., Charing Cross Road, London W. C. 2. (7) Consult *Industry Year Book and Directory* for the complete list of sugar mills. (8) Read "Sugar in India" by H. H. Ghosh published from this office. (9) Wants to know the addresses of agents of Java Sugar in India. (10) The method of preserving egg appeared in December, 1934, issue of *Industry*.

3313 H. M., Bombay—(1) Consult "Manufacture of Ink" price Rs. 1/8/- only, published from this office. (2) The colours may be supplied by Fuzle Hossain & Bros., 44, Armenian Street, Calcutta.

3315 N. I. & C. W., Multan City—Collapsible tube for tooth paste and cream may be supplied by Shah & Co., 55, Ezra Street; Sikri & Co., 55, Canning Street; both of Calcutta.

3316 Y. S. A., Ahmedabad—(1) Consult *Industry Year Book & Directory*. (2) For second-hand bobin enquire of Continental Textile Stores Co., P. O. Box No. 770, Bombay; Greaves Cotton & Co. Ltd., 1, Forbes Street, Bombay. Wants to be put in touch with 2nd. hand Warper Willson bobin dealers. (3) Not known. (4) For a list of jails in India write to the political department of the Secretariat of every province. (5) Regarding registration of trade mark etc. Bombay address is not available. You may have Calcutta addresses in *Industry* under classified bargains. (6) Wants to be put in touch with owners of Spinning & Weaving Factories.

3317 J. M. B., Amritsar—(1) Puff for dusting face powder may be supplied by D. N. Bhattacharyya & Sons, 33, Canning Street, Calcutta.

Amano Shoten, Bakuromachi, 2-Chome, Higashiku, Osaka, Japan; Kyoshin & Co., 62, Unagidani Nakanocho, Minamiku, Osaka, Japan; Bruckhorst, Carl, Hamburg; Felix, Gustav, 16, Virehew Strasse, Teplitz-Schonau (C.S.R.); Goebel, W., Porzellanfabrik Wilhelmsfeld, Germany (2) Printed tin cans for tooth powder may be prepared from Metal Decorating and Shaping Co. Ltd., 112, Narkeldanga Main Road, Calcutta.

3318 S. B. L., Udipl—(1) An elaborate article on ginger and its cultivation etc., appeared in September, 1934, issue of *Industry*. It is a profitable industry no doubt and you will find its market in Bombay. (2) Sardine oil may be utilised in soap manufacture.

3319 A. S., Bahawalpur State—Lottery information is not in our line.

3320 T. H., Gujrat—Confectionery has been fully dealt with in "Profitable Industries" price Rs. 1/8/- only, published from this office.

3321 H. S. M. C., Mecca—For perfumes write to the following parties direct: Heine & Co., Leipzig, Germany; Madanlal Dayal & Co., Marriot Road, Karachi; Perfumery Ingredients Co., 31, Mangaldas Road, Market, Calcutta.

3322 B. I. W., Gaya—(1) The following is the recipe of Drakshasava:—Take raisins 6½ seers and water 128 seers, boil them together till reduced to one fourth, and strain. To the strained decoction add 25 seers of sugar and 8 tolas each of the following in fine powder viz., cinnamon, cardamom, tejpatra, flowers of Woodfordia floribunda, fruit of Aglaia Roxburghiana, black pepper, long pepper and habarang seeds and set aside for fermentation. (2) Chalk for canvas shoes:—Pipe clay 16 oz., Spanish whiting 8 oz., Flake white 6 oz., Precipitated chalk 4 oz.; Powdered tragacanth 2 oz.; Carbolic acid 2 dr. Mix the powders and knead with water. Divide the paste into small pellets and cast each into suitable moulds. (3) Yeast may be had of James Anderson & Co., 8, Lindsay Street, Calcutta; Dinshaw & Sorabjee, Sealdah Station, Calcutta; Uyeda Ichi Shoten, Kita Kyutaromachi 4-Chome, Higashiku, Osaka, Japan. (4) The sole agent for India of Messrs. W. J. Bush & Co. Ltd., London is not known but Sikri & Co., 55, Canning Street is an agent.

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3323 M. R. Kalighat—Picture cards including photos of film stars and beautiful women may be had of Shree Sharda Picture Co., Shibu Thakur Lane, Calcutta; Calcutta Commercial Bureau, Kalighat; India German Trading Co., Rawalpindi; M. Vadial & Co., 136, Princess Street, Bombay 2, Bombay Fine Art Gallery, 69, Esplanade Road, Bombay; R. Ethurajiah & Sons, 103, Devaraja Mudaly St, Madras.

3324 J. N. C., Ootacamund—(1) Solder for aluminum:—Aluminium 1 part, phosphor tin (containing 10% of phosphorous) 1 part, zinc 11 parts and tin 29 parts. The aluminium is melted first, the zinc is added in small pieces, then tin and lastly phosphor tin. Aluminium must be heated to about 600°F before it can be soldered. (2) Brazing:—The most common method may be called brazing by radiant heat in which the parts to be united are fastened together by means of wire revets and then held in a very intense heat until the spelter or brass melts and runs between the pieces to be joined. (3) Coat the rusted parts with zinc or regalanize. (4) Copper sheets for brazing may be supplied by W. Leslie & Co., 19, Chowringhee Road, Calcutta.

3325 Y. D., Surat—(1) The manufacture of all kinds of lozenges will be found in Profitable Industries price Rs 1/8/- only, published from this office. (2) Ball lozenges can be prepared at home, without the help of machinery. (3) Harmless colour for such purpose may be had of Fuzzle Hussein & Bros., 44, Armenian Street, Calcutta.

3326 M. C., Chikballapur—(1) Cloths may be prepared by hand loom or powder loom. Stockings etc., belong to the category of hosiery which are done by knitting machine. (2) The following colours ground in boiled linseed oil are used in painting upon glass: White—Flake white; black—Lamp black, ivory black; Brown—umber and orpiment; Blue—Prussian blue, ultramarine blue; Red—Vermillion, red lead, Indian red, carmine; yellow—English ochre, masticot; Green—verdigris. (3) As for the orbit of the sun the prevailing idea is—it is elliptical. About your discovery on this matter you may send your thesis to the Royal Geographical Society, London.

3327 J. M. D., Wadagadi—(1) The formula of Brahmī Hair Oil appears elsewhere in this issue. (2 & 3) Sulphuretted lime is calcium sulphide and not sulphate. It may be had of B. K. Pal & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta. (4) The process of deodorising coconut oil appeared in January, 1935, issue of Industry. (5) Hair dyeing oil appeared in July, 1933, issue of Industry.

3329 C. L. C., Miani—(1) Practical training in the art of gur and sugar manufacture is given by Mallick Agricultural Farm, Ranaghat. (2) The book on the subject to be recommended is "Sugar in India" by H. H. Ghosh price Rs. 3/8/- only, published from this Office. Also go through the article sugar from date and palm published in December, 1934, issue of Industry. (3) Rubber and celluloid toys cannot be prepared in small scale to stand in the teeth of Japanese competition.

3330 B. E. S., Quetta—(1) Importers of Electrical goods:—Duncan Stratton & Co., Bank Street, Bombay; English Electric Co. Ltd., Ballard Estate, Bombay; Turner Hoare & Co. Ltd., Apollo Bunder, Bombay; Alfred Herbert (India) Ltd., 13E, Strand Road, Calcutta; Associated Electrical Industries (India) Ltd., 8, Clive Street, Calcutta; F. & C. Osler Ltd., 12, Old Court House Street, Calcutta; Albion Electric Works, 17, Vepery High Road, Madras; British Electric Co., (S. V. R. S.), 93, Godown Street, Madras; T. G. Diwan & Co., 263, China Bazar, Madras. (2) Parchment paper may be supplied by Chandra Mohan Sur & Co., 105, Radha Bazar Street, Calcutta; Bholanath Dutt & Sons, 167, Old China Bazar Street, Calcutta; Parekh & Co., 58-60, Goa Street, Fort, Bombay.

3331 C. L., Pilbhit—(1) The books referred to may be had of W. & G. Foyle, Ltd., 119-125, Charing Cross Road, London W.C.2. (2) Paint & Varnish dealers and importers:—Don Watson & Co., 8, Lyons Range, Calcutta; Gillanders Arbuthnot & Co., 8, Clive Street, Calcutta; Jensen and Nicholson (India) Ltd., 2, Fairlie Place, Calcutta. (3) Verdigris, Barytes, talite etc., may be supplied by paint and varnish dealers. (4) Vernacular synonyms of drugs may be found in Indian Materia Medica by K. M. Nadkarni, P. O. Box 3558, Bombay 4. (5) Sporting goods dealers:—Carr Mahalanobis & Co., 3, Chowringhee Road, Calcutta; S. Ray & Co. Ltd., 11, Esplanade East, Calcutta; Din & Co., 1, Hewett Road, Allahabad; Kukiraja Stores, Huzratganj, Lucknow.

3332 D. R. C., Pathankot—Cement manufacturers:—Bihar Lime & Cement Co. Ltd., Jhajha, Monghyr; Sone Valley Port & Cement Co. Ltd., Japla, Bihar (Rohtas); Asano Portland Cement Co. Ltd., Osaka, Buildings, 1, Sozecho, Kitaku, Osaka, Japan; Hokoku Portland Cement

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Co. Ltd., Osaka Branch; Mitsui Bldgs., 1, Koraihashi 3-Chome, Higashiku, Osaka, Japan.

3338 J. S. J., Amritsar—Replied by post under No. 360, dated 3rd. January, 1934.

2339 M. O. M. C. L., Muttra—(1) The statistics regarding production and consumption of the oils are not available, those of seeds are given below from which an approximate quantity may be derived. Production of mustard seed: in 1926-31, 967 thousand tons, in 1931-32—1,025 thousand tons, in 1932-33—1,047 thousand tons; 1933-34, 3235 thousand tons; Castor seed; 1932-33—151 thousand tons, 1933-34—146 thousand tons. Import of vegetable ghee:—In 1930-31,—296,026 cwt., valued Rs. 10,903,399; 1931-32—116,849 cwt., valued Rs. 2,241,637; 1932-33,—36,659 cwt., valued Rs. 1,345,725. (2) The annual issue, we have, is Industry Year Book and Directory.

3341 N. G., Diplo—Dietz Lantern may be had of Satcowrie Das & Co., 196, Old China Bazar Street, Calcutta; R. E. Dietz Co., New York, America.

3342 S. C. V., Lahore—(1) Training in sugar manufacture may be had of Mallick Agricultural Farm, Ranaghat; Harcourt Butler Technological Institute, Cawnpore; (2) Soap making is taught at Soap Training House, Saidpur, E. B. R., Calcutta School of Cottage Industries, 6, Ramanath Majumdar Street, Calcutta; Central Poly-Technic Institute, Lashkar, Gwalior. (3) Fountain Pen Ink:—Gallic acid 1 oz.; tannin 3 oz.; gum arabic 1 dr.; carbolic acid 1 dr.; ferrous sulphate 2 oz.; Ferric chloride solution 10% 1 oz.; Indigo-tin 1½ oz., water 7½ pints. Dissolve the gallic acid and tannin in 6 pints of hot water and dissolve the other ingredients in the remaining portion of water without the application of heat. Then mix the two solutions and set aside for a fortnight and filter before bottling.

3343 U. S. C. W., Coimbatore—The formula and process of Sugar candy will appear in an early issue of Industry.

3346 N. C. M., Delhi—Dry cell manufacturing machinery may be supplied by Industrial

Machinery Supplying Co., 14, Clive Street, Calcutta. They will also furnish you with estimates and other necessary information. The process of manufacture has been clearly dealt with in the article, "Dry Batteries: Their Construction and Uses" published in May, 1934, issue of Industry.

3347 M. I. R., Bombay—Refining of fish oil:—Take 100 lbs. of the oil in a pan; add to it 1.6 lbs. of soda silicate diluted with 25 lbs. of water and boil. After a little while when the scum begins to float add 5 lbs. of salt and boil briskly removing the scum occasionally. When the oil becomes clear and no dirty froth is visible remove from fire and let the oil settle. Next day take away the oil carefully leaving impurities underneath. For industrial purpose it may be used in soap making.

3348 G. S. N. R., Guntur—Preparing point to the fountain pen nib:—At first, iridium ore is heated in a Hessian crucible to a white heat and after adding phosphorous the heating is continued for a few minutes. A perfect fusion of metal is obtained and can be cast into any desired shape. For making points the fused metal is poured between two iron plates which are kept apart at proper distance so as to make a sheet iridium of the desired thickness. The sheets are then cut up into small irregular pieces, which are soldered on a strip of bronze and ground down to a flat surface upon a copper lap. Corundum or diamond dust mixed with oil is applied to the flat surface of the lap by means of a flat steel instrument upon which pressure is exerted in order to force the corundum or diamond dust into the copper, thereby making a cutting surface. The detailed process may be found in February, 1932, issue of Industry.

3350 K. R., Vaddur—Replied by post under No 1676 dated 20th December, 1934.

3351 P. C. C., Karachi—You may negotiate with P. K. Ghosh, 12/1A, Nayanchand Dutt Street, Calcutta.

3353 M. V., Bangalore City—For literature regarding thread ball making machines write to

TOILET SOAP BASE.

MANUFACTURERS AND DEALERS.

Do away with the laborious task of soap boiling. We will supply you with perfect toilet soap base (Chips), ready for passing through your milling plant. Most economically, without trouble, you can prepare your own toilet soap with your own brand.

Even if you do not own a soap milling plant, we will supply you with a perfect toilet soap, with your own name. We would perfume the soap to your choice, and the colour too, you could suggest. Our soap base is guaranteed for purity, being made under the supervision of a qualified German Chemist. Ask for Samples and prices:

New milling and plodding soap machinery just received, for sale. Moderate price.

TOMSON & CO., SOAP SUPPLIERS: 129, Khetwadi, Bombay 4.

Oriental Machinery Supplying Co. Ltd., 20, Lall Bazar Street and Industrial Machinery Co., 14, Clive Street; both of Calcutta.

3354 H. G. B., Hamirpur—(1) For making scented cards mix thoroughly coumarin 10 gr.; vanillin 10 gr.; hebotropin 10 gr.; ionone 10 minims; hyacinthine 5 minims; essence of musk 30 minims; otto of rose 5 minims; rectified spirit 1 fl. oz. Then soak a piece of blotting paper in the mixture. The cards to be scented are put up in a closed box along with blotting paper for a day or so. The cards will imbibe the scent. (2) For a list of contractors you may write to railway or army office. (3) You may write to S. Mitra & Co., 30, Bentinck Street, Calcutta for electroplating equipment. (4) For tin printing write to Metal Decorating & Shaping Co. Ltd., 112, Narkeldanga Main Road, Calcutta. (5) You better consult a homeopathic physician.

3356 G. S. A. S., Amritsar—(1) A formula of transparent soap will be found in September, 1934, issue of Industry. (2) A good recipe of hair dye solution will be found in August, 1934, issue of Industry. (3) September, 1934, issue of Industry contains formulas of snow cream and hair destroying powder. (4) A good recipe of hair destroying soap will be found in October, 1934, issue of Industry. (5) Process of manufacturing cold cream will be found in November, 1934, issue of Industry.

3358 C. V. R., Madras—Benares series;—write to Indian Textile Co., Benares City; Mohini Mohan Kanjilal & Bros., Benares City and Motchand Kanjilal, Thatheri Bazar, Benares City and Maniklal Chatterjee, Benares City.

3359 P. S. N. R., Jamshedpur—Formulas you require will appear in an early issue of Industry.

3362 S. N. M., Jammu—(1) Process of modelling plaster of Paris, toy making etc., will appear in an early issue of Industry. (2) For preparing artificial marble take marble powder, white cement and plaster of Paris. Proportion should be adjusted by actual experiment. (3) Process of manufacturing rubber toys will be found in December, 1934, issue of Industry.

3364 I. S. B., Meerut Cantt—(1) Process of preparing vaseline will be found in July, 1933, issue of Industry. (2) A formula of carbolic tooth powder will be found in October, 1934, issue of Industry. (3) We do not generally publish recipe of patent medicine.

3365 S. M., Tanjore—(1) You better consult a mechanical engineer who will help you in making water meter and centrifugal blower. (2) Other preparations you require will appear in an early issue of Industry.

3367 T. D. Karachi—(1) For cloth printing blocks write to Bharat Chitralaya, 355, Upper

Chitpore Road, Calcutta. (2) Process of preparing printing paste will be found in October, 1934, issue of Industry.

3368 K. R. M., Lahore—You should appoint canvassers who will approach the Government and States for securing printing work from them. They should always take with them samples of printing with quotation.

3370 V. S. B., Damoh—You can preserve lemon juice and sell in the market. As regards processes if you do not understand them you may consult a chemist who will practically demonstrate before you. Vide No. 3295 above.

3371 M. K. K., Veranal—Following is a list of homeopathic colleges: The Dunham College of Homeopathy, 135/3, Bowbazar Street; Bengal Allen Homeopathic College, 169A, Bowbazar Street; The Calcutta College of Homeopathy, 266, Upper Circular Road and R. C. Nag Regular Homeopathic College, 166, Bowbazar Street; all of Calcutta.

3372 P. P. S., Travancore—For manufacturing sand paper you may use glue. As regards paper you may use manila paper.

3374 A. K. A., Pendra Road—Following is a list of litho press: Ballosi Fine Art Litho Press; Tardeo, Bombay; Duyan Sagar Litho Press, Girgaum, Bombay; Lion Lithographic Press, Bazar Gate Street, Bombay; Ravi Fine Art Litho Press, Kalbadevi Road, Bombay; Shri Krishna Art Litho Press, Girgaon Road, Bombay; Art Press, 20, British Indian Street, Calcutta; Bengal Litho Press, 1, Wellington Square, Calcutta; Calcutta Printing Co. Ltd., 76, Dharamtala Street, Calcutta and Imperial Art Cottage, 1, Tagore Castle Street, Calcutta.

3377 M. Z. A., Chittagong—Cardboard box making machine may be had of John Dickinson & Co. Ltd., Grosvenor House, 21, Old Court House Street, Calcutta. Estimate for starting a factory will be supplied by the above firm.

3378 R. R. C., Lyallpur—Following is a list of shops owned by Europeans: Whiteaway Laidlaw & Co. Ltd., Chowringhee; Army & Navy Co-operative Stores, Chowringhee; Francis Harrison Hathaway & Co. Ltd., 13, Government Place East; all of Calcutta.

3379 A. S. A., Jharsuguda—(1) Grind the glass and put it in crucible. Now apply heat when glass will melt. (2) Lens is made from lead glass. (3) Take 100 parts chalk powder and 30 parts rolled sulphur. Put them in a crucible and apply heat when calcium sulphide will be made. (4) Following is a recipe of blue marking ink: Resorcin blue 1 dr., distilled water q.s.; oxalic acid 10 gr.; sugar $\frac{1}{2}$ oz. The colour is first dissolved in 6 dr. of distilled water. Agitate occasionally for 2 hours; then add 24 oz. of hot distilled water and prescribed quantities

of oxalic acid and sugar. (5) For secondhand machines you may enquire of Oriental Machinery Supplying Co. Ltd., 20, Lall Bazar Street, Calcutta.

3380 H. C. L. K., Cannanore—Soak the husk in water for several days when this will soften. Now you may make yarn from the coir.

3382 T. K. K., Cochin—Process of deodorising methylated spirit will appear in an early issue of Industry.

3387 P. G. N., Ranipet—(1) It will not be profitable to spin from the fibre sent by you as other fibres are so cheap in the market again strength of the fibre does not indicate its commercial value. (2) As regards tamarind you may preserve this by unseeding the ripe tamarind and drying in the sun. Now pack in earthen vessel air-tight. It will not be profitable to manufacture tartaric acid from tamarind as the percentage of acid obtained is very low and the manufacturing cost is high. Yes office paste may be made from the starch obtained from tamarind seeds. (3) You may try the following recipe for manufacturing fly paper: Simple syrup 100 parts, honey 20 parts; extract of quassia wood 4 parts; oil of aniseed a few drops. First prepare the simple syrup by boiling 2 parts of sugar in 3 parts of water. Then prepare the extract of quassia by boiling 7 lbs. of quassia with successive portions of water until exhausted. Concentrate to 1 gallon. Now mix the two and add the other ingredients. Lastly, dip unsized brown paper in this; dry and cut into strips. (4) Castor oil refined by adding oxalic acid should not be taken internally.

3389 G. T. B. B., Satara—Process of making photo on handkerchief will be found in September, 1934, issue of Industry. Ingredients you require may be had of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta.

3395 B. S., Multan City—Process of manufacturing essence of lemon and orange will appear in an early issue of Industry.

3396 T. L. A., Irinjalakuda—For silk yarn you may write to Polhumal Bios., 37, Canning Street, Calcutta and for cotton yarn write to Jhalbharnull, 161-1, Harrison Road, Calcutta.

3398 P. C., Tuticorin—Ready made boxes are not available you have to prepare them yourself. Timber may be had of Howrah Mechanical Wood Works, 254-2, Panchanantala Road, Howrah and Beliaghata Box & Timber Co., 8, Chaulputty Road, Beliaghata, Calcutta.

3401 H. P. K., Bombay—Proportion of the sizing to be mixed with should be ascertained by actual experiment.

3402 H. S., Jamshedpur—(1) Honey is clarified by melting in a water bath and strained while hot through a piece of flannel previously moistened with water. Honey, therefore, has

sound biochemical basis, more so because it favourably compares with the well known patent food liquid glucose which contains only about 35 per cent. of monosaccharides in the form of dextrose and lack the valuable proteins, fats and inorganic salt present in honey. (2) Process of manufacturing washing soap will be found in December 1934 issue of Industry. (3) For small printing machines you may enquire of W. H. Sellars, 14, Hare Street, Calcutta. (4) You may enquire of Deshabandhu Tailoring Academy, 15, College Square and Free Commercial College, 43, Bowbazar Street; both of Calcutta. (5) For German slates you may enquire of L. N. Chunder & Co., 114, Radha Bazar Street and Satya Charan Banerjee & Co., 94, Radha Bazar Street; both of Calcutta. (6) Following is a list of paper mills: Bengal Paper Mills Co. Ltd., 103, Clive Street, Calcutta; Deccan Paper Mills Co. Ltd., 815-816, Bhowanipeth, Poona; Girgaum Paper Mills, Girgaum, Bombay; Indian Paper Pulp Co. Ltd., 8, Clive Row, Calcutta; Lucknow Paper Mills, Lucknow and Titagarh Paper Mills Co. Ltd., Chartered Bank Bldgs, Clive Street, Calcutta. (7) For ready made clothing write to Wachel Molla & Co., Dharamtala Street; Jaharlall Pannalall & Co., College Street Market; Kamalalaya, College Street Market and Chandra Kumar Baikuntha Nath Gun & Co., College Street Market; all of Calcutta.

3403 S. R. K., Navsari—(1) The ingredient should be tincture saffron as suggested by you. (2) For fountain pen engraving machine write to G. C. Law & Co., 33, Canal East Road, Calcutta. (3) It is not possible to keep coconut oil in liquid state in the winter without mixing with it til oil or white oil.

3405 G. T., Pegu—We have no book dealing with the manufacture of paper flowers. You may write to Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

3406 B. H. Y., Mundargi—(1) Statistics regarding consumption of camphor and borneol are not available. (2) Can supply asbestos, yellow, brown and red ochre and alkanet root. (3) Wants to be put in touch with suppliers of cold drawn castor oil. (4) Washing soda may be had of Imperial Chemical Industries (India) Ltd., 18, Strand Road, Calcutta.

3407 S. G. S., Jharia—We only sell our publications. For industrial hooks you may enquire of Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

3408 R. K. B., Mymensingh—For yarn required you may enquire of Kesoram Cotton Mills Ltd., 8, Royal Exchange Place, Calcutta.

3410 P. E. W., Peshawar—Along with electroplating business you may also start grinding knives and razors and polishing business.

You may also manufacture brass fittings for furniture and cabinet makers.

3414 A. M., Narayanganj—You may start envelope making factory if you can sell them locally. Envelope making machines may be had of Oriental Machinery Supplying Co. Ltd, 20, Lall Bazar Street, Calcutta.

3415 A. C. J. S., Raipur—Glass bangles are manufactured by Bombay Acid Proof Bangles Co., Bandra, Bombay; Hanuman Glass Works, Firozabad, Agra; Bhagwat & Co., Kolhapur and Girwardhari Lall, Mohan Lall Agarwall, Firozabad, Agra. Other processes you require will appear in an early issue of Industry.

3416 S. S. M. C., Rawalpindi—(1) During the year 1932-33 39154 sewing and knitting machines were imported to India from United Kingdom, Germany and other countries. (2) You may consult any book on company law which may be had of Chakraverty Chatterjee & Co Ltd., 15, College Square, Calcutta. (3) For company registration you may consult a lawyer. (4) If you can invest sufficient capital you may introduce hire purchase system. (5) For other information you may write direct to parties dealing in different kinds of sewing machine.

3417 K. E. M., Aligarh—(1) An article on dry cell making will be found in May 1934 issue of Industry. If you go through the article you will find all the information you require. (2) Dry cell making machines may be had of Industrial Machinery Co., 14, Clive Street, Calcutta. (3) Following towns have electric power: Berhampur, Burdwan, Mymensingh, Howrah, Chinsurah, Rangpur, Serajgunge, Gauhati, etc.

3418 I. F. S., Ahmednagar—An article on boot and shoe manufacture will appear in an early issue of Industry.

3419 A. B. W., Peradeniya—We sell only our own publications. For the book you require enquire of Book Co. Ltd., 4/4A, College Square, Calcutta.

3421 C. B., Dera Ghazi Khan—You may try B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane and A. K. Laha, 1, Dharamtala Street; both of Calcutta for colour.

3422 D. Y., Jetpur—You may use rubber solution a recipe of which will be found in January 1934 issue of Industry.

3425 K. V. H., Hubli—There is no such institution in India at present. You may however write to the School of Cottage Industries, 6, Ramanath Mazumdar Street, Calcutta regarding industrial training.

3426/A. T. P., Kottar—Yes, you may open a branch of your business if you find sufficient number of customers in the locality.

3427 R. A. P., Kanara—We advise you to manufacture disinfecting fluid which is common-

ly known as phenyle which has got good demand in the market and at the same time it seems to be profitable.

3430 R. M. S., Agra—Tin bottles may be had of Metal Decorating & Shaping Co. Ltd, 112, Narkeldanga Main Road, Calcutta.

3433 R. N. R., Agra—There is no such tailoring institute in India at present. You may however try the following institute: The National Tailoring & Cutting Institute, Bara Bazar, Bareilly; The Bhatnagar Tailoring Institute, Civil Lines, Bareilly; and The Calcutta Commercial Institute, College Street Market, Calcutta.

3434 P. N. V. C., Delhi—You may consult Independent Careers for the Young published from this office. You may also write to W. Newman & Co. Ltd., 3 & 4, Old Court House Street, Calcutta for books dealing with block making.

3435 V. S., Bezawada—Dry cell making machines may be had of Industrial Machinery Co., 14, Clive Street, Calcutta. The above firm will supply you with an estimate for starting a factory. Formula of canvas shoe dressing will appear in an early issue of Industry.

3436 T. C. B., Madras—It is very difficult for us to suggest any business which will be profitable. In starting a business the most important thing required is capital. But you have very little capital. So in the beginning you may start your career as a salesman or an agent. In such business no capital investment is required. In this way when you have collected sufficient capital you may start a business of your own safely with your mature experience.

3441 Q. S., Betul—(1) To refine lemon juice you may filter it. (2) Potassium metabisulphite may be had of B. K. Paul & Co., 1 & 3, Bonfields Lane, Calcutta. (3) Enamelled ware and glass or earthen ware the most suitable for storing lemon juice. (4) Caramel colour may be had of B. K. Paul & Co., Ltd., 1 & 3, Bonfields Lane, Calcutta. (5) Following is the process of making tincture of lemon peel; Fresh lemon peel, sliced thin 1 part; proof spirit 1 part; macerate for 7 days in a closed vessel with occasional agitation strain, press, filter and make up with spirit to 8 parts.

3442 T. C. K., Old Sukkur—Formula of electric sparkler is not available.

3443 A. S. A., Darbhanga—(1) All the chemicals you require may be had of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane; Bengal Chemical & Pharmaceutical Works Ltd., 31, Chittaranjan Avenue and Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane; all of Calcutta. (2) A good formula of snow cream will be found in September 1934 issue of Industry.

3444 S. L., Meerut City—Your query being in the nature of an advertisement should not be published in these columns.

3446 A. K. R., Madura—For rubber sponge mat enquire of Whiteaway Laidlaw & Co. Ltd., Chowringhee, Calcutta.

3447 P. I. P. W., Pilibhit—(1) For colour and brushes you may enquire of Abinash Chandra Dutt, 23-2, Dharamtala Street and A. K. Laha, 1, Dharamtala Street; both of Calcutta. (2) For readymade design you may write to some artists.

3448 M. H. A. H., Gorakhpur—Following is a list of hardware dealers: Harada Shoji Kaisha Ltd, 9, Andojbashi-dori 3-Chome, Minami-ku, Osaka, Japan; Iwata Shokai Ltd., 64, Bakuromachi 2-chome, Higashi-ku, Osaka, Japan and Moritani & Co Ltd, 15, Itachibori Kitadori 5-Chome, Nishi-ku, Osaka, Japan

3449 R. P., Patna—(1) An article on marble paper manufacture will appear in an early issue of Industry (2) You may start dyeing and printing of cloth if there is great demand for dyed and printed cloth. (3) Demand for toys made of papier mache is not so great so it is not advisable for you to start a factory for making toys of papier mache. (4) You may try to be an apprentice in a fountain pen repairing shop. (5) Picture frames may be had of Star Art Framing Works, 90, Meadows Street, Bombay and Dey & Co., 2-2 & 2-3, Corporation Street, Calcutta.

3451 D. S. S., Mirpurkhas—(1) If you are really interested in preserving Indian sweets you may engage an expert who will help you. These are generally preserved in concentrated syrup and packed air tight. For machineries you may write to W. J. Alcock & Co., 7, Hastings Street, Calcutta. You may write to Bata & Co., Konnagar, E. I. Ry.

3454 A. J., Kurla—We cannot find the name of firm.

3455 C. B., Ahmedabad—Along with book selling business you may also take up printing business. You may publish books of different authors. As regards terms you should always look to your advantage. Author may take 25 p.c. of price of the books sold. For detail information go through Reader's Business Problem column. You may also deal in sporting goods

3456 H. L. J., Agra—(1) Following is a list of gold and silver thread manufacturers: Amritbhai Jethabhai, Manchupura, Surat; Bhairchand Gulabchand, Manchupura, Surat; Govindbhai Durlabhi, Moti Sheri, Surat and Vaju Bhai Chunnilal, Gopipura, Surat. (2) Novelties may be had of Hernin & Co., 21/1, Creek Row, Calcutta; M. Lilaram & Co., A-4, New Market, Calcutta and S. W. Hari Prasad, B-24, New Market, Calcutta.

3457 H. L. R. S., Hassan—Benares saris may be had of Balajee & Co., Chow, Benares City; Meenakshi Silk Co., Benares City and Maniram Harijanram, Gaighat, Benares City.

3459 F. M., Jhang City—For manufacturing sugar you may go through July 1932 issue of Industry. Small sugar making machines may be had of Bhowani Engineering & Trading Co. Ltd., 56, Gouribari Lane, Calcutta. Hosiery machines may be had of Indo-Swiss Trading Co., 2, Church Lane, Calcutta.

3460 Mangalagiri—Platinum tungstic acid, etc. may be had of Hamilton & Co. Ltd., 8, Old Court House Street, Calcutta.

3461 J. F., Badarpur—(1) You may write to Industrial Machinery Co., 14, Clive Street, Calcutta and H. Parson Ltd., Asian Bldg., Nicol Road, Ballard Estate, Bombay. (2) Gum tragacanth may be had of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta.

3464 H. L., Fatehgarh—Yes you may start a shop dealing in all sorts of electrical goods and you may also take up fitting the houses by supplying cables casing, etc. Electrical goods may be had of Anglo-Electrical Co., 54, Ezra Street; Clyde Electric Stores, 21/2, Chowringhee Road; Electric Trading Co., 54, Ezra Street and F. & C. Osler Ltd., 12, Old Court House Street; all of Calcutta.

3466 P. B., Prantij—(1) Products of Messrs Burgoyne Burbidges & Co. may be had of B. K. Paul & Co. Ltd.; 1 & 3, Bonfields Lane, Calcutta. (2) Address of Uebersee Post is 1, Salomonstrasse, Leipzig, Germany. (3) Agent for E. Merck, Germany is Martin & Harris Ltd., Rowlette Bldg., Prinsep Street, Calcutta. (4) Process of manufacturing antiphlogestic paste will be found in November 1934 issue of Industry.

3467 H. P. T., Ghazipur—(1) In making tablets you should use adhesive besides medication; you may use any one of the following adhesives: Gum acacia, glucose, gelatin, etc. (2) Yes liquid extracts are concentrated decoctions. (3) The nozzle you require is not available. (4) We are not aware of any such advertising agent. You may however communicate direct with the parties offering your terms. (5) Aniline dyes may be had of Fuzichussain & Bros., 44, Armenian Street, Calcutta. (6) For other chemicals you may enquire of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta.

3468 F. C. H., Rohri—(1) Artificial silk is not manufactured in India at present. Fabrics are made from artificial silk yarn imported from foreign countries. (2) You may consult. The Manufacture of Artificial Silk by E. Wheeler published by Chapman & Hall Ltd., 11, Henrietta Street, London W.C.2, and Artificial Silk Its Manufacture and Uses by Thomas Woodhouse published by Sir Isaac Pitman & Sons Ltd. Parker Street, Kingsway, London W.C.2.

3469 K. N. S., Coimbatore—We have no book on laundry business. You may secure laundry machine from Germany, England and America. Laundry machines may be supplied by Hillebrand Walter, Osnabruck, Germany; A. Hamner & Co., Berlin S W 48, Germany; American Laundry Machinery Co., Cincinnati, Ohio, U. S. A.; Troy Laundry Machinery Co. Ltd., Chicago, Illinois, U. S. A., D. & J. Tullis Ltd., Sussex Place, Hammersmith, London W 6 and Cherry Tree Machine Co. Ltd., Cherry Tree, Blackburn.

3470 G. H. A. R. F. C., Boisar Road.—Process of manufacturing salt will be found in Chemical Industries in India published from this office. We are not aware of the plant required by you

3472 V. K. P., Trichinopoly—Dyes you require may be had of Fuzlehussein & Bros., 44, Armenian Street, Calcutta.

3473 N. G. G. S., Salem—(1) First prepare gur from palmyra juice. From this gur you can manufacture sugar by centrifugal machine (2) In manufacturing slate pencils, limestone is used as one of the ingredients. Slate pencil can be made in the following way. Take slate powder 6 parts; lime stone dust 3 parts and sodium silicate 1 part. Knead the mixture into a plastic mass and force through a perforated plate so that each pencil is deposited on a grooved slate. The ends are cut off with a sharp saw. (3) Process of manufacturing washing soap will be found in December 1934 issue of Industry. (4) Melt the ghee and pour in the tins and solder. (5) For preserving butter you may add 2 grains of borax per lb. of butter. (6) You may make buttons out of coconut shells. (7) Slates cannot be manufactured from soap stone. (8) Following is a list of ghee merchants in Calcutta: Abinash Chandra Dutt & Sons, 3, Burtolla Street; Ashoke Chandra Rakshit, 26, Cotton Street; Dasarati Rakshit, 152, Cotton Street; Laxmidas Premji, 9, Parsee Church Street; Mahananda Dutt & Co., 65, Strand Road and Nandalal Kurari, 107, Darnahatta Street, Calcutta.

3475 P. H. A., Nagercoil—(1) For Japanese goods you may enquire of Mitsubishi Shoji Kaisha Ltd., 135, Canning Street, Calcutta and to Indo-Japanese Commercial Museum, 135, Canning Street, Calcutta. (2) Motor parts and accessories may be had of Chiyoda Trading Co., Nippon Kogyo Bldg., Maruno-uchi, Tokyo, Japan. (3) For phono goods write to K. Hattori & Co. Ltd., 17, Bakuromachi 4-Chome, Higashiku, Osaka, Japan. (4) Leather cloth may be had of Asahi Leather Co. Ltd., 37, Takamicho 1-Chome, Nishiyodogawa-ku, Japan. (5) Ply wood may be had of Iwai & Co. Ltd., 43, Kitahama 4-Chome, Higashi-ku Osaka, Japan.

3477 M. D. M., Mandalay—You may try the following formula for making blue-black ink; Gallic acid 2 lbs.; tannic acid $\frac{1}{2}$ lb.; ferrous sulphate (pure) 3 lbs.; aniline blue 14 lbs.; carbolic acid (pure) $\frac{1}{2}$ oz.; water (soft) 35 gallons. Dissolve ferrous sulphate in part of the water, add gallic and tannic acids previously in remaining part of the water. Then add aniline colour and carbolic acid, mix thoroughly and allow to stand for some days. Decant or filter.

3479 W. K. B., Lahore—(1) We are not aware of English name of padopandi. (2) Woollen goods after weaving require finishing. The cloth after weaving is rough and threadbare in appearance and it has now to be filled. This is done by immersing it in water in which has been made a lather of soap or ritha (sapiidus detergens) and kneading the cloth with the hands or feet. If the cloth is then pegged out to dry, shrinking is avoided, if not pegged out, it shrinks considerably whether pegged out or not, the surface becomes uniform and the separate threads are either not distinguishable at all or very little so. If the cloth has been made out of real worsted yarns no felting is required; such a yarn is used when cloth like serge is made in which the threads are to remain visible; but such cloths of country make are uncommon. In all cases too, washing after weaving has to be done to clean the cloth.

3480 G. S. P., Mangalore—Government Test House, Alipore, Calcutta analyses a thing and gives certificates. You may also write to R. V. Briggs & Co., 8B, Lall-Bazar Street, Calcutta and Sudhindra Nath Sen, 6, Kirti Mitter Lane, Calcutta, for chemical analysis.

3481 B. B., Karachi—For manufacturing celluloid toys you better engage an expert who will help you in all matter regarding starting a factory, machinery required, capital to be invested etc.

3482 N. M. P., Bombay—Process of preserving fruits will appear in an early issue of Industry.

Make Big Money
Profit 1000 %

Manufacturing specialities in spare time.
No experience or capital required. Write
for details (enclosing stamp if possible) to—
LEAGUE OF PROSPERITY PLANNERS,
2B, Bela Road, Delhi.

REVIEW OF BOOKS

MONEY AND SOCIAL JUSTICE by Rev. F. H. Drinkwater. Published by Burns Oates & Washbourne Ltd, 43, Newgate Street, London E.C.1. Pages 86, price 2s. 6d.

The present volume draws pointed attention to the pinch of poverty in the midst of plenty. There is an abundance of all the necessities of life—food, clothing, shelter and warmth. Plenty is waiting for every body but the people are most terribly plunged in debt and cannot even possess the bare essentials. The present age can rightly be characterised as the Age of Unlimited Plenty and the Age of Unlimited Debt. The market is flooded with cheap goods but all the money have accumulated in the hands of the moneylenders, with the consequence that the purchasing power of the people has declined miserably. The States, as well, are heavily in debt and are still borrowing from moneylenders. The net result is this that art, education, sanitation and religion are suffering alike.

The author shows in this book the utter futility of Government borrowing when money is more and more being divorced from gold. The Government instead of borrowing money on the strength of the nation's power to produce goods can as well create it itself, by King's authority, on the strength of the very same thing. This is a step which will set the whole world in order. It will add to the purchasing power to all who at present have to go hungry and cold and ragged amid plenty, and will help them to liberate themselves from the grip of the financiers who by controlling credit raise prices up at will. This credit reform is not a new idea altogether. Gesell was thinking and writing about it in the nineties and the catholic School of Fribourg even earlier than it. Eisler, Kitson, Douglas, Prof. Buchi and Prof. Shaddy have been at it. The subject should draw increasing attention from the economists.

THE BRITISH PROBLEM by Sir Charles Petrie, Bt., M. A. (Oxon), F. R. Hist. S. Published by Ivor Nicholson and Watson Ltd, 44, Essex Street, Strand, London W.C.2. Price 2sh.

This is a nice little book presenting in a small compass the great problems which confront the English nation at the present crisis. Unfortunately muddled thinking has become one of the most prominent characteristics of the national life there. The whole country is divided into a large number of political factions, each having a grooved line of thinking, and the situation is no less ruinous than that during the

War of Roses. The man-in-the-street has come to regard Parliament as a place where form is everything, where the real important issues are never discussed, and whence proceeds a mass of legislation mainly calculated to prevent him from getting on with his job. It is increasingly more difficult to persuade men of the right type for election to the House of Commons. There is an absence of a settled theory of taxation, based upon ethical as well as financial considerations. Any continuity of policy has been impossible, for no administration has much hope of winning two successive general elections at a time when the work of consolidation is essential after a period of expansion.

As in the realm of politics the economic life of the country is ridden over with antagonistic parties, namely capital and labour, who have hardly any common platform to stand upon. The Imperial problems have to some extent become the toys of the parties at Westminster. It is difficult to express an opinion on Imperial economic policy without being classed either as a satellite of Lord Beaverbrook or as an unrepentant Free trader. The League of Nations has far more to fear from its friends than its enemies.

The author of this book does not belong to any party machinery and has therefore been at liberty to express his opinions on the varied problems with complete freedom. He shows that three things are essential now: (1) the reform of the Parliament, (2) a constructive Imperial and foreign policy; and (3) square deal for every man and woman. The suggestions are constructive and thought provoking.

BRITISH EMPIRE TRADE INDEX. Published by Business Dictionaries Ltd., 8 & 9, Johnson's Court, Fleet Street, London E.C.4.

We have received a copy of the 1934-35 Edition of British Empire Trade Index which contains a list of classified trades and professions of the whole Empire comprising Great Britain, Canada, Australia, New Zealand, Union of South Africa and India. Among other useful things it contains a list of commodities which are produced in the above countries. The addition of an alphabetical index by name of all firms appearing in the books has enhanced the utility of the book to a great extent. Another interesting section is a list of Trade Marks and Brands which will be of great value to firms who protect their goods by means of Trade

Marks and Brands. On the whole the book will be of immense value to those who desire to establish trade relations with the different parts of the British Empire.

SKINNER'S COTTON TRADE DIRECTORY OF THE WORLD, 1934-35. Published by Messrs Thomas Skinner & Co., Gresham House, Old Broad Street, London E.C.2, Pages 929 Price 20 Shillings.

The twelfth issue of Skinner's Cotton Trade Directory more than upholds the reputation of its predecessor, which we had to review in our columns last year. The present number is thoroughly revised and re-written to make it up to date and the inclusion of a section giving the "Yarns Spun," lists of those spinners of Great Britain Spinning Indian and Waste Yarns, together with the counts spun materially enhances the importance of the book as a standard work of reference relating to cotton trade and industry. The hosiery and knit goods manufacturers section has also been considerably augmented, and the type of machines used by these manufacturers has been indicated as far as possible. The trade names of articles manufactured by many firms and companies in this section are also mentioned.

The directory consists of the following sections: Cotton statistics; list of cotton exporters and merchants; cotton spinners and manufacturers; cotton yarn and piecegoods finishers; fabrics; silk and rayon; hosiery and knit manufacturers (British) and mill suppliers. The addresses have been grouped separately under the respective countries of origin, which again have been put in an alphabetical order. The make up of the book is excellent and the index helpful. Persons engaged in cotton trade must have a copy for reference.

OFFICIAL SOUTH AFRICAN MUNICIPAL YEAR BOOK, 1932-33. Edited jointly by W. P. M. Henderson and Frances G. Pay. Published by Francis G. Pay, Adservice Building, 72, Loop Street, Post Box 1136, Capetown. Selling Agents Messrs. J. C. Juta & Co., Capetown, South Africa. Price 25s. nett.

This official year book contains the statistics relating to the municipalities of South Africa compiled from data supplied by the various municipal officials of the Local Government.

In discussing the workings of municipalities the authors have divided the book into several sections such as Cape Province, Natal, Transvaal, Orange Free State, Rhodesia, and South West Africa municipalities. The population figures

given in the book reflect the actual population within the areas administered by each municipality and are made up to date each year as far as possible. These figures therefore are more accurate than the Government census returns which are usually compiled periodically. In the Electric Light and Power section is shown by a scale diagram the number of units sold in the various South African Towns. There are also tables showing general particulars of municipal generating plants, financial details of municipal undertakings, tariff charges, etc. There are also other sections dealing with tramway undertakings, motor omnibus undertakings, motor transport, engineering data, water supply statistics, etc. The book will be found useful to those who wish to study the municipal administration of South Africa.

MODERN WAYFARERS IN PERSIA by Constance M. Alexander. Published by Arthur H Stockwell Ltd, 29, Ludgate Hill, London E.C.4. Price 5s., page 176.

Although Persia is one of the most ancient and civilised countries of the world, our knowledge of Persia is very scanty. This is due to lack of descriptive literature of the country. The author has removed this want to a great extent by publishing this book which deals with description of the country including facts and histories of the different towns.

The advent of motor car has changed Persia, now one can cover the long distances which separate the towns in a few hours, and at a fair speed compared to the laborious journey of fifteen or twenty years ago, when pony or mule was the only form of conveyance. But one of the most important questions of Persian travel is the obtaining of a good chauffeur mechanic, one who is familiar with the roads of the country, who can make himself at least understood and who knows the police regulations. A strong high power motor car is not necessary but it makes travelling very pleasant.

The whole book has been written in very simple and lucid style so that reader will never feel himself tired and the description is so vivid and realistic that he will think as if he is actually touring through the country. The author first gives an account of the border land including the Caspian Sea. Then he describes the important cities, viz., Teheran, Isfahan, Shiraz, Tabriz, etc. He concludes the book with a brief history of Persia which enhances the importance of the book as a guide to intending travellers who contemplate a trip through this interesting country.

NOTICES & REVIEWS.

[Manufacturers sending specimens and samples of their products for notice and review may please note that no notice is published of medicinal preparations and allied substances in this section.]

Inks.

We have received from The Standard Ink Factory, Moradabad, U. P. samples of rubber stamp ink, blue-black ink, marking ink and two packets of blue ink tablets. The preparations are in no way inferior to similar such articles.

Chalk Crayons.

We are glad to receive samples of white chalk crayons from Scientific Product Co., 6, Kirti Mitter Lane, Calcutta. The crayons are found to be of good quality and are in no way inferior to those of imported stuff

Arc-Welding Equipment.

We are glad to receive the general specifications of the arc-welding equipment from The Lincoln Electric Coy., Cleveland, Ohio. U. S. A. They are the largest manufacturers of arc-welding equipment in the world and have branches and distributing agencies in all principal cities.

Picture Album.

We have the pleasure to acknowledge receipt of a copy of photo album of the National Leaders of India from Messrs M. Vadilal & Co., Kalupur Tankshal, Ahmedabad & Princess Street, Bombay No. 2. The album contains 16 well and artistically printed photos of the well known leaders and 4 monocolour printed plates. The price of a copy of album is 8 annas.

New Journals.

Young Reader is a new monthly devoted to the interest of youngsters. It carries information of all kinds and in a manner quite presentable to young folk. It is published by the Little Flower Co., 317, Lingha Chetty Street, Post Box 99, G. T., Madras. We welcome the issue.

"Farmer" is a new agricultural magazine published by the authorities of the renowned "Globe Nursery," 25, Ramdhone Mitter Lane, Shambazar, Calcutta. It is mainly devoted to the development of agriculture. We welcome the timely appearance of the journal.

We gladly welcome this agricultural journal Krishi (Agriculture) in Bengali published by the Gardening Welfare Association, 162, Bowbazar Street, Calcutta. Its aim is to cater exclusively the modern methods of agriculture to the innocent peasants.

An All-India Industrial Exhibition.

The 3rd. All-India Industrial Exhibition will be held in Delhi under the auspices of the Association for the Development of Swadeshi Industries, Chandni Chowk, Delhi. The Exhibition will commence from 24th February and continue till 4th April 1935.

Rice Novelty.

We appreciate very much the mystery rice, a curious invention by The Modern Arts Museum. About one hundred letters are dexterously inscribed on an ordinary grain of rice. It is sent to us as a present in a nice carton. The office of the museum is situated at Kashmiri Gate, Delhi.

Writing Inks, etc.

We are glad to receive from Golden Industry, 933, Sowrashtia Big Street, Kumbakonam, S India samples of blue-black ink, red ink, violet rubber stamp ink and sealing wax. The preparations are found to be quite satisfactory and can stand side by side with the best brands of similar articles selling in the market. We wish them a wide sale

A Book on Health and Hygiene (in Bengali).

We have received a copy of "Mustiyoga and Swasthakatha" by Kaviraj Girijanath Ray. It contains many useful information about the curative values of many herbs and fruits indigenous in India and also shows the ways of maintaining good health by observing the laws of nature. The book may be had of the author at 35, Scott Lane, Calcutta. Price As. 10.

A Booklet on Lac.

This booklet "The Lac and its Industrial Values" is the result of researches on Lac by N. H. Qadri B.A., D.F.H. (Lond). It deals not only with a new process for the cultivation and propagation of lac insect and the collection of the same as a by-product from Arhar tree (Cajanus Indicus) but also contains some of the new industrial uses of lac and shellac as suggested by the author. We hope that lac growers will be highly benefitted by reading this book. The booklet may be obtained from the author, 2/D/3, Cantopher Lane, Entally P.O Calcutta. Price Rs. 2-8.

Trade Enquiries.

(To communicate with any party write to him direct with name and address given below mentioning *Industry*)

3214 M. A. Hameed, 1928, Chowraha Dhoolpet, Hyderabad Deccan—Wants to be put in touch with prominent tea factories of China and Kashmir.

3360 S. S. Sarna, Baber Shah, Srinagar, Kashmir—Wants to be put in touch with the suppliers of sandalwood inlaid with ivory.

3363 Balatshi & Co., 14, Rangaswamy Street, Mannady, Madras—Want to be put in touch with pain balm manufacturers of the Madras Presidency.

3381 The Prabhakar Oil Mill, Karanja, Akola—Want to be put in touch with the firms in Bombay dealing in groundnut expeller cake.

3397 A. C. Gandhi & Bros., Opp Prem Gate, Atta Mills, Post Railway, Ahmedabad—Want to be put in touch with the suppliers of pumice stone and soapstone blocks of different sizes in large quantity and also with mills manufacturing till cake.

3458 Bharat Oil Co., McLeod Road, Karachi—Want to be put in touch with the manufacturers of cotton seed oil in India.

3465 Gordhandas Khimjee Asher, Port Road, Mangalore—Wants to be put in touch with dealers in coffee seeds and pepper.

3490 A. M. Patel, Karamsad, Kaira—Wants to be put in touch with the Bombay firms dealing in inkpot, cardboard boxes, labels, corks and ink ingredients.

3539 Pandit Shivji Bhut Wahi, 3rd Bridge, Srinagar, Kashmir—Wants to be put in touch with the suppliers of seeds of hookah tobacco.

3541 E. L. Zakariah & Bros., Vallyapally Street, Kottayam, Travancore.—Can supply tea, rubber, pepper, dried ginger, cashewnut, mace, nutmeg, etc.

3559 K. Varatharajulu, Chandragiri—Wants to be put in touch with the importers of beedi in Bombay, Calcutta, Penang, Singapore, Rangoon, F. M. S.

3587 General Supply House, Sutahat, Cuttack—Want to be put in touch with suppliers of cow and buffalo dry gut, tiger fat, lizard, snake and crocodile skins, deer and elk-horns, shark-fin and fish gut.

3615 The Oriental Sugar Works, Mirkote Saharanpur—Want to be put in touch with dealers in kurris.

3619 Nathi Ram, Abdullapur, Ambala—Wants to be put in touch with foreign or Indian firms dealing in ginger and other forest products.

6637 D. S. L., Rajapakse, Dehigahapitiya, Avissawalla, Ceylon—Wants to be put in touch with the firms interested in Ceylon gems in the following countries: India, Afghanistan, France, Switzerland, U. S. A., Germany etc.

MARCH ISSUE OF INDUSTRY.

(In the Press.)

March issue of *Industry* which will be published on the first day of the month will contain articles on Wood Distillation and Manufacture of Spirit Varnishes and Lacquers in addition to the usual features such as Small Trades and Recipes; Formulas Processes and Answers; Reader's Business Problems; Brief Queries and Replies. Any friend of our subscribers will get a copy free as sample on application to the Manager, *Industry* Office, Shambazar, Calcutta.

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BUSINESS NOTICE.

Industry is published in the first week of every month. Subscribers will receive only the number from April to March comprising a complete volume for one year's subscription, unless they mention otherwise.

Subscription money is always payable in advance or by V. P. P. The foreign subscription should be sent by B. P. O.

At the time of sending a V. P. P. only the current number is generally sent. The previous issues of the volume are sent per bookpost on receipt of the value of the V. P. P.

NOTICE TO ADVERTISERS.

All charges for advertisement from old and new parties are strictly payable in advance and no request for realisation by V. P. P. is entertained unless substantial deposit is previously made.

Contract especially as regards position is not valid unless confirmed by us in writing and accompanied by cash in sufficient time. Advertisement when published in other places than ordered for is payable at the rate scheduled for that position.

Ordinarily advertisement forms close on 20th of the month and all copies and remittances must reach this office at least two days before the date, and for special issues, 10 days before that unless otherwise notified.

For rates and other particulars write to:—

Manager, *INDUSTRY* OFFICE,

22, R. G. Kar Road, Shambazar, Calcutta.

Phone B.B. 3858.

INDUSTRY

THE MAGAZINE FOR MANUFACTURERS & BUSINESSMEN.

VOL. XXV.

CALCUTTA, MARCH, 1935.

NO. 300.

OUR JUBILEE YEAR.

A NOTABLE year is coming on us—this is 1935-36, From signs of the world situation that are manifest we may expect many startling events.

High expectations are on tip-toe in Russia. Much brooding and broiling are in evidence in France and Germany. The United States are seeking opportunity; so also Japan. England and Italy are watching the situation.

Out of the economic distress into which the world has been plunged for the last few years one fundamental fact emerges. It is the failure of big industrialism to adjust itself to the re-action of an overglut of riotous production, of catastrophic falling of prices and of defective distribution of primary commodities.

Primary needs throw us back to primitiveness—of production and manufacture. Food and clothes and home are primary needs that cannot be denied. Hunger and poverty and wagelessness are in a sense unnatural and therefore uneconomic.

Immeasurable waste tracts and innumerable methods of small production are awaiting cultivation and human handling that shall convert them into colonies of contended industrious folks. Virgin soil is calling for fruitful ploughing. Unemployed artisans are looking for productive occupations.

The year appears to be one of many opportunities—this is the Jubilee year of *Industry* when in April it will reach its 26th. birth day. Ours is a land that literally flows with milk and honey. It is now parched with mass poverty: a people whose living is incredibly cheap know not from father to son and grandson the comfort of a daily satisfying meal and daily engaging occupation year in, year out.

The obligation of reconstructing India's economic structure rests primarily on the Indians—on you if you are an Indian. Let us not evade that issue. Let us give our best to India's best. In other spheres we have toiled, suffered, sacrificed, achieved. Let young India come forward to build the prosperity of New India on the foundation of golden cereal, and humming hand mills.

In the Jubilee year *Industry* deals with mass industrial activities for mass employment. It carries message of hope and happiness in every home.

Let not anyone's door be shut against it.

DISTILLATION OF WOOD

OF the various methods of utilising waste wood, distillation seems to offer the greatest possibilities for effectively dealing with a considerable portion of the total waste. Most of the methods suggested in this article can only be applied to relatively small proportions of the material available. Distillation to yield mainly charcoal, acetic acid or acetate and methyl alcohol, offers the possibility of developing a large industry and one, moreover, that is in a sense a key industry, for its products are of the utmost importance as a raw material in the manufacture of various useful substances.

Originally the distillation was carried out for the manufacture of charcoal alone. For this purpose the old fashioned kilns were used, in which portion of the wood was burned and the heat developed carbonized the balance. All the by-products escaped into the air and were lost. This process is, therefore, wasteful and inefficient but is suitable only to supply a local demand for charcoal.

The first step in improving this process was the use of retorts for the distillation and the condensation of the alcohol, tar, acetic acid. A further step in the development of the industry was the substitution of the modern oven retort for the cylinder retort. Acetic acid and acetates were the main products besides charcoal but the demand for wood alcohol led to improvements in the condensers and distillation apparatus. Besides alcohol, acetone and charcoal turpentine, wood oil and oxalic acid are

directly or indirectly obtained on a commercial scale from wood, but the yield is governed largely by the specific gravity, and kind of wood, as well as by the manner in which the manufacturing process is conducted. Many other farm products, such as sugar cane, jute stalks, corn stalks, straws, etc., will yield these products and it is possible that many other wastes may in future be utilised in this way.

A brief description of the modern distillation process and a few typical plants follow.

MATERIALS USED.

Heavy hardwoods are the best materials for distillation but the presence of tannin, gums, and resins in them is a disadvantage. Almost any limb or body wood together with its bark down to 2 inches diameter to 8 inches can be used. If thicker than this it is split. Heart wood is generally believed to be better than sap wood.

The wood is cut into lengths averaging 18 inches long, and is stacked to air season for periods of from one to two years. This is necessary for various reasons. Green wood consumes a large amount of fuel and time to distill off the excess of moisture. Both of these are important points. Time is important because a charge must be pushed through the retort in 24 hours, and if the wood is too moist this necessitates excessive temperatures and poor results. Moreover the distillate from green wood is more dilute than from dry and takes larger plant and more fuel to concentrate. Even when it is air dry the wood con-

tains 12-25 per cent of moisture. If allowed to stand too long the wood loses seriously in value from decay and oxidation. Two years is considered the maximum time allowable.

PLANTS REQUIRED.

DESCRIPTION OF EQUIPMENT:—The apparatus required for the destructive distillation of wood consists of:—

1. Retorts or ovens in which distillation is carried on and the chief chemical reactions involved in the production of the crude products take place.

2. Condensers in which the condensable vapours are liquefied.

3. Stills in which crude products are separated, concentrated and purified.

4. Mixing pan for the preparation of acetate of lime.

5. General apparatus—such as evaporating pans, storage tanks, coolers, pump, etc.

The various forms of kilns in which wood was formerly charred are of historic interest especially in connection with the modern improved retorts; but as the yield of alcohol and acetate is very low even in the best kilns, these old forms are now only employed in localities producing charcoal iron, where charcoal is practically the only product recovered.

When attempts was made to cover and condense the volatile products an airtight iron retort known as the "Swedish Thermokettle" set in brick work and connected with a condenser, was devised and is still quite extensively employed.

The plant may be assembled and arranged in any desired manner, but it is highly desirable that full advantage be taken of natural conditions, that as much

labour as possible performed by machinery, and that the whole establishment be conducted under the most rigid control, in order that the plant may be profitably worked and losses at any point quickly discovered.

TYPES OF CONDENSERS:—The condensers are of the greatest importance. They should be sufficiently large to condense all the products even under the most adverse condition as the material lost at this stage can never be recovered. For separating the constituents of the distillate a sample still, such as is used in the preparation of distilled liquors, may be used, although an iron still is generally preferred in distilling the alcohol and acetone from the acetate of lime. For the storage and settling tanks, it is customary to use wood; all pipes, pumps, and other apparatus through which the acid liquors pass must be of copper or wood.

OUTLINES OF THE PROCESS.

The stacked wood is put into the retort and its door is closed before distillation commences.

There are, roughly speaking, three stages in the distillation. In the first, water is driven off. This lasts till the temperature is about 150°C. Then in the second, the temperature slowly rising, the products of decomposition begin to come off. The acids are formed first, formic more rapidly than acetic. The tar soluble in pyroligneous acid next forms, and then the oily tar which settles out of the acid. The methyl alcohol begins to form late, preceding only the oily tar. It is necessary, therefore, to carefully control the temperature just before the tar begins to settle out in the distillate,

in order to get the best yield of alcohol. At 270°C the reaction becomes exothermic and the heating needs to be controlled, otherwise the distillation becomes violent and the results are poor. This may be regarded as the third section of the distillation, and very careful temperature control is essential. The time of distillation is about 24 hours. The temperature need never rise above a maximum of about 430°C for distillation is complete at this temperature.

The products of the distillation are led to condensers, where the tar, alcohol, acetic acid, water and other condensable substances are separated and run away to a suitable receptacle. At the end of the distillation the back door of the retort is opened and the trucks of hot charcoal are pulled out into a cast iron cooler of the same dimensions as the retort, but of thinner iron. Here the trucks remain for 24 to 48 hours to cool off. They are then pulled into a second similar cooler and left for another 24 hours, and finally pulled out as finished charcoal.

These precautions are necessary to prevent the charcoal firing. It is hot and very porous, and so extremely liable to vigorous oxidation in the air with consequent rise of temperature.

The raw liquor or pyroligneous acid consists of water, 85-90 per cent; alcohol and acetone, 4-4½ per cent; acetic acid, 7 per cent; and tar partly in suspension and partly in solution, and small quantities of other substances. It is settled in wooden vats to separate tar as far as possible. Unless the tar is well separated in the settlers the acetate of lime made is black. The liquor is then

distilled in a copper still to remove alcohol, and acetic acid and the alcohol is distilled off. This weak alcohol (about 10 p.c.) is then again distilled in a steel still with a copper fractionating column, the product being 82 per cent. alcohol.

The liquor after it is distilled from the tar on standing yields oils which are separated. The tar which is distilled to free it from acetic acid, etc., also yield oils, which are separated. These oils are sometimes added to the boiled tar and burned, and in other cases are used for various purposes.

MAIN PRODUCTS.

The main products yielded by the distillation are:—

- (1) Charcoal,
- (2) Tar and wood oil
- (3) Uncondensable gas.
- (4) Pyroligneous acid.

Charcoal:—The yield is about 25 to 35 per cent of the weight of wood used. This varies a good deal with the nature of the wood, and with the conditions of distillation. Its physical condition also depends largely upon these conditions. High temperatures give dense charcoal. Its main use has been for iron smelting, charcoal being comparatively free from phosphorous and sulphur and in this having the advantage over coke.

TAR.

Wood tar is a dark-red thick liquor, with a characteristic smell and an acid reaction. The yield varies from 5 to 15 per cent. It is used for preserving wood for making roofing felts, as an antiseptic, and for the preparation of wagon grease and other low grade lubricants.

Wood tar is a thick, dark coloured, viscous material, still containing some acetic and other acids and has a specific gravity of about 1.05 to 1.15. It consists when derived from hardwood chiefly of paraffins, toluene, xylene, cresol, phenol, and methyl derivatives of pyrogalol. The tars derived from coniferous woods constitute the chief tars of commerce, and are particularly rich in turpene, contain considerable quantities of rosin and have a much greater commercial value than those derived from hardwood.

WOOD-OIL.

When 2 crude aqueous distillate is first distilled in order to separate acids, alcohols, and acetone from the tar, some of the light oils which are present distill with the acid alcohol and finally remain in the alcohol still, or if the distillation is carried out further, they pass over in the last stages and separate as an oily layer.

UNCONDENSABLE GAS.

Gases produced during distillation constitute from 20 to 30 per cent of the wood, consist of about 53 per cent of carbon dioxide, 38 per cent of carbon monoxide, 6 per cent of methane and the remaining 3 per cent of nitrogen, hydrogen, etc. These gases are of such low illuminating power that they usually either burned under the boilers or retorts or are wasted.

PYROLIGNEOUS ACID.

General Treatment for the Separation of Acetic Acid and Methyl Alcohol:—This distillate comprising from 30 to 50 per cent, of the weight of the wood, contain as its chief constituents methyl alcohol 4 to 6 per cent. acetic acid 8 to 14 per cent. acetone 2 per cent. and tar held in solution by the acids and alcohol

present, the balance being practically all water contained in the wood and resulting from its decomposition. The distillate is a dark red liquid having a strong acid reaction. Its specific gravity varies with the amount of water in the wood and the character of wood used. This crude liquor is used to a limited extent in making pyrolignite of iron or black iron liquor, an impure acetate of iron used in dyeing and calico printing. There are a number of different methods followed for separating the tar from this aqueous distillate and the several valuable constituents of the latter from each other. In practice one of the two following general methods is used in handling the settled liquor:—

1. It is neutralised directly with lime and the alcohol distilled. The resulting calcium acetate is much contaminated with tar and when evaporated and dried at about 125 deg. C forms the commercial "brown acetate of lime" containing from 65 to 75 per cent. of real acetate of lime the balance being tarry matter, calcium carbonate and water.

2. The crude pyroligneous acid without previous neutralization is distilled from the tar it contains. This is better practice. Distill the alcohol, acid and other volatile constituents, leaving only tar in the still. Then carefully neutralize this distillate with milk of lime and force it to a still and redistill. Alcohol, aldehyde and acetones pass over, while acetic acid remains in the still in combination with lime. The most perfect separation and highest yields are obtained by this method. The substance produced by treating the acid solution

with milk of lime is known as grey acetate of lime.

Acetic Acid:—Commercial acetic acid is produced from grey acetate of lime or from brown acetate previously heated to about 230 deg. C to destroy tarry matter by distilling with concentrated hydrochloric or sulphuric acid. The latter is rarely used, as the calcium sulphate formed is difficult to remove from the stills and the impurities in the acetate reduce the sulphuric to sulphurous acid, which contaminates the acetic acid. A single distillation yields a slightly coloured solution, containing 30 to 50 per cent. of acid which may be further purified by heating with potassium bichromate or permanganate and redistilling. The first portion of the distillate is contaminated with formic and propionic acids but the subsequent portions are nearly free from impurities.

Glacial Acetic Acid:—Glacial acetic acid is prepared by heating fused sodium acetate with concentrated sulphuric acid in a porcelain lined or earthenware still and then distilling, when a nearly anhydrous product is obtained which crystallises if cooled to 16.5 C.

The ordinary acetic acid of commerce contains about 30 per cent. anhydrous acid, has a specific gravity of 1.040 and is slightly coloured. It is used in the preparation of acetate, the manufacture of white lead and in pharmacy. Some pure acetic acid made from wood by distillation is used as vinegar; but such preparations have not the characteristics of fruit vinegar.

In addition to acetate of lime and soda the following acetates are prepared for industrial purposes.

1. Aluminium acetate.
2. Chromium acetate.
3. Copper acetate.
4. Lead acetate.

Crude Methyl Alcohol and Acetone:—The distillate obtained from the acetic acid or calcium acetate in the lime still contains the following:—From 8 to 10 per cent. of methyl alcohol; acetone (methyl acetate), some acetic acid and oily hydrocarbons and ketones. It is necessary therefore to remove these impurities which is done by fractional redistillation and repetition of the same.

Pure Methyl Alcohol:—As alcohol and acetone form mixtures having a minimum boiling point, it is impracticable to separate them by simple distillation, and therefore other means are employed. The alcohol is treated with chlorine, which combining with the acetone present form chloracetones having higher boiling point than methyl alcohol, so it is separated by distillation.

Pure Acetone:—It is a colourless liquid having a peculiar ethereal odour, and a burning taste, a specific gravity of 0.814. It is miscible with ether, alcohol and water in all proportions. Commercial acetone should not have a specific gravity of 0.802 at 15 deg C. It is an excellent solvent for resins, gums, camphor, fats, gun cotton, and is largely used in the manufacture of smokeless powder, the preparation of celluloid goods, chloroform, iodoform and sulphonol.

The Manufacture of Spirit Varnishes & Lacquers.

THE manufacture of spirit varnishes is an extremely simple operation, and can be carried out by dissolving resins in oil of turpentine, alcohol, acetone, and other volatile solvents without the addition of any drying oils. Their process of manufacture is as follows:

These varnishes as a rule, dry off very quickly, with a high lustre, and hence are largely used as protective coatings for indoor work.

The broken-up resin is emptied into a large barrel, which is fixed on to support on which it can revolve. The required amount of solvents is added, the cover screwed on, and the contents churned for a few hours till solution has taken place.

In the case of the higher boiling paint solvents it is usual to melt up the resins in a steam pan or by direct heat over a fire, and then to stir in the solvent or alternatively, to warm up the solvent and stir in the finely-powdered resins.

By this means the process of dissolving the resins is very considerably accelerated. The varnishes may be filter pressed to remove any suspended matter.

ALCOHOLIC SPIRIT VARNISHES.

The most important of the alcoholic spirit varnishes, and the one in most general use, is shellac varnish, which is manufactured in large quantities for use in the polishing of furniture, and is sold under the name of French Polish. It is made by dissolving shellac in methylated spirit in the cold in the following manner:—

5 lbs. of Venice turpentine and 60 lbs. of orange shellac are churned for 6 hours with 40 gallons of methylated spirit. The resulting varnish has an orange-brown turbid appearance, and dries in about 10 minutes, with a hard lustrous coat. The Venice turpentine helps to toughen the film and so increases its durability.

This varnish is applied with a rubber; a large number of exceedingly thin coats are laid on to the article which is being polished, and by this means a beautiful lustrous finish is obtained.

For white varnishes bleached shellac is used; for dark varnishes ruby or garnet shellac.

WHITE HARD SPIRIT VARNISHES.

These varnishes are made by dissolving spirit soluble Manila gums in alcohol or methylated spirit, usually about 3 lbs. of Manila gums to 1 gallon of alcohol being the proportion adopted. They are clear, transparent varnishes and are largely used as paper varnishes.

For marking spirit Manila varnishes only those copal gums should be selected which will readily dissolve to a clear solution, free from slimy or stringy qualities. They dry off very quickly with a high lustre.

BROWN HARD SPIRIT VARNISH.

This varnish is made in a similar manner to white hard spirit varnish, but a small percentage of Bismarck brown is added to give the requisite colour.

ROSIN ALCOHOLIC SPIRIT VARNISHES.

These are made by dissolving pale rosin in alcohol, about 4 lbs. of rosin to 1 gallon of alcohol. They are rather brit-

tle, hence are only used for common work.

In addition to the resins already mentioned, many others can also be used in which may be mentioned gum mastic, sandarac, elimi, etc.

Various softening agents may be used in small proportions in conjunction with the above-mentioned resins in order to toughen their films and prevent them from flaking off. The usual ones employed are castor oil, Venice turpentine, gum thus, copaiba balsam, and Burgundy pitch.

The following recipes taken from Livache, Hurt, Bottler, and others will give a general indication of the various proportions which are commonly employed in the preparation of alcoholic spirit varnishes, and the purposes for which they are used:

DARK BROWN POLISH.

Garnet shellac	40 lbs.
Methylated spirit	25 gallons.

WHITE POLISH.

Bleached shellac	40 lbs.
Methylated spirit	27 gallons.

SHELLAC SPIRIT VARNISH.

Orange shellac	10 lbs.
Venice turpentine	3 lbs.
Alcohol	36 gallons.

BOOK-BINDERS' VARNISH.

Shellac	82½ lbs.
Spirit of turpentine	3 gallons.
Methylated spirit	80 gallons.

BOOKBINDERS' WHITE VARNISH.

Sandarac	6 parts.
Mastic	3 "
Elemi	3 "
Alcohol	150 "

PAPER VARNISH.

I.

Sandarac	50 lbs.
Thick turpentine	30 lbs.
Alcohol	15 gallons.

II.

Manila copal	16 parts.
Venice turpentine	5 "
Alcohol	30 "

ROSIN VARNISH.

Pale rosin	23 lbs.
Venice turpentine	4 lbs.
Alcohol	15 lbs.

NEGATIVE VARNISH FOR PHOTOGRAPHERS.

Gum sandarac	5 oz.
Gum benzoin	2 oz.
Methylated spirit	½ gallon.

COLOURED LACQUERS.

Coloured lacquers are made in large quantities for colouring metals, wood, leather goods, etc. They are applied to metals in two ways, known as "cold lacquering" and "hot lacquering."

The colouring of the lacquers or spirit varnishes is usually effected by adding to them concentrated alcoholic solutions of aniline dye-stuffs. Formerly the naturally occurring colouring substances such as dragon's blood, turmeric, gamboge, logwood extract, and others were used for this purpose, but at the present time these have been replaced by spirit aniline colours. These colours are soluble in alcohol, and are manufactured in all tones and shades suitable for different types of work. The following recipes for the preparation of various coloured lacquers will give a general idea as to their composition:—

DEEP GOLD LACQUER.

Bleached shellac	3 lbs.
Methylated spirit	2 gallons.

Concentrated solution of Diamond-Fuchsine $\frac{1}{4}$ pint.

PALE GOLD LACQUER.

Bleached shellac 10 oz.
Methylated spirit 1 gallon.
Aniline yellow concentrated solution $\frac{1}{4}$ pint.

BLUE LACQUER.

Shellac 5 oz.
Sandarac 5 oz.
Elemi 2 oz.
Alkali blue concentrated solution $\frac{1}{4}$ pint.

VIOLET LACQUER.

Shellac 2 oz.
Sandarac 8 oz.
Elemi 3 oz.
Methylated spirit 1 gallon.
Methyl violet concentrated solution $\frac{1}{4}$ pint.

TURPENTINE SPIRIT VARNISHES.

These spirit varnishes may be made by dissolving the resins in the turpentine (or turpentine substitutes such as white spirit, benzol, etc.) in the cold in precisely the same way as described under the alcohol varnishes, hence are more easy to apply.

DAMMAR VARNISH.

This varnish is largely used as a paper varnish under the name of crystal paper varnish. It is also used in the preparation of white enamels, as, on account of its low acidity, it can be mixed with zinc oxide without any "livering" or

thickening up taking place. The enamels thus prepared are of a pure white colour and dry quickly with a high gloss.

Dammar varnish is prepared by melting pale dammar gum and thinning down to the right consistency with turpentine or white spirit. The following proportions may be used:—

Dammar	10 oz.
Sandarac	5 oz.
Mastic	1 oz.
Turpentine	2 oz.

The mastic and sandarac gums are added to give toughness and elasticity to the varnish.

ROSIN, TURPENTINE SPIRIT VARNISHES.

These varnishes may be prepared by churning rosin or hardened rosin with turpentine till solution is effected, or the rosin may be melted and the turpentine stirred in till the required consistency is obtained.

White spirit and naphtha are often used in place of turpentine to cheapen the varnish.

Rosin spirit varnishes are largely used as furniture varnishes and cheap oak varnishes for inside work. They dry with brilliant glossy surfaces, but are too brittle to be very serviceable, and are liable to powder off on rubbing.

They are also used in the manufacture of common quickdrying varnish paint with the addition of pigments such as red oxide, lithopone, carbon black, and so on.

Simple Methods to Caseharden Iron & Steel.

CASEHARDENING, or the process of making soft steel and iron hard on the surface, may be done by anyone. This valuable process enables the worker to make tools from as tough a grade of mild steel as he may choose and at the same time produce hardness where it is wanted without making the metal brittle, writes Mr. C. A. Cowley in a recent issue of *POPULAR MECHANICS*. As an illustration suppose you are making an axle shaft for a sanding machine which will have to stand severe use and accordingly must be able to resist bending and mechanical shocks and at the same time must be so hard that it will wear a long time in its bearings. For a problem like this the best thing to do would be to select a tough grade of low carbon steel and caseharden the surface to produce wearing properties. By using this process it is possible also to fashion cutting tools from soft steel, which cannot be hardened by ordinary methods, and then caseharden the parts which are to be ground to a cutting edge. Where great strength is required this process offers the ideal solution as it makes possible the combination of great strength and extreme hardness in the same piece of metal. In casehardening, the surface of the metal is first made to absorb carbon, the element which gives steel its hardness. This is called carburization. By carburization the surface of the iron is changed into steel which may be hardened and tempered in the same manner as tool steel.

The piece to be casehardened is packed in an iron pot, completely sur-

rounded with a carburizing compound. The compound may be purchased ready mixed from a supply house, or, if preferred, a good one may be made by mixing hard-wood charcoal, 13 parts, barium carbonate, 3 parts, precipitated chalk or whiting, 1 part, and sodium carbonate or soda ash, 2 parts, all by weight. The pot may be made from a short length of gas pipe and a pair of pipe caps to fit. The dimensions shown in the drawing were selected as being convenient and may be varied to suit the work at hand. One of the caps should be put on loosely so that it may be removed easily. This cap should also be the one through the centre of which a hole is drilled to serve as a vent and to permit the introduction of a thermocouple pyrometer. Although a thermocouple is not absolutely necessary for this work, it is highly convenient. In its absence temperature can be judged by colour. After thoroughly cleaning the work, it is placed in the pot, care being taken to completely surround it with the compound. The work should not touch the sides of the pot.

The heating is done best in gas-fired furnace. If a forge is at hand it may be used for the heating. In this case, the pot with its charge is packed into the hot coals which should completely surround the pot. In either method the work is slowly brought to a bright orange temperature, or if a pyrometer is used, to a temperature of between 1,600° and 1,750° Fahr. The lower temperature should be used for small articles. When this temperature is reached the fire is adjusted carefully to hold the tem-

perature as uniformly as possible. The approximate time, after the work has been brought to temperature required, to produce various depths of hardening may be determined by trial. If you are uncertain as to how thick a case you wish to produce, small pieces of metal of the same kind as the work should be inserted into the pot with the charge at the start. Remove one of them from time to time and quickly plunge it into cold water. These test pieces are removed easily without disturbing the charge if attached to short lengths of wire which extend through the vent hole. The hardness of the case may be tested by applying a file, and the thickness of the case checked by grinding through the case until the soft metal is reached. After heating the work the required period of time, the pot should be taken from the fire and its cap removed. The contents are then dumped quickly into a tub of cold water to harden the work. A good quenching tub is generally provided with an arrangement for a blast of air to assure rapid and uniform cooling. The air supply may be had from a small compressor. If air is not available, running water may be used alone provided the work is not all dumped into one spot too quickly. This method of hardening is usually satisfactory for small articles; however, for large work it is a good plan to allow the carburized work to cool in the pot without quenching in water and later to reheat to the hardening temperature and dump into the cold water as just explained.

Sometimes you may wish to harden only a portion of the surface of a job. There are several ways of accomplishing

this and the method selected will depend upon the nature of the work at hand. The simplest method consists in copper-plating the parts which are not to be hardened before placing them in the pot. This is done most readily by immersing the well-cleaned work for two seconds in a dip-plating solution made by dissolving copper sulphate, 10 oz., in water, $\frac{1}{2}$ gal. To this solution is added slowly with caution, concentrated sulphuric acid, 1 oz. This solution should be kept in a stone jar. Cleaning is accomplished by scrubbing with strong soap and washing thoroughly in clean water. The parts to be hardened should be painted with orange shellac or melted paraffin before dipping them into the plating solution. The paraffin or shellac will burn off when the work is heated and in no way interfere with the casehardening, although the copperplated portions will not be hardened at all. The copper-plating solution also may be applied with a brush to the parts that are to remain soft. Another system in common use for preventing parts from becoming hardened consists in leaving spare metal, which can later be removed either by grinding or by a finish cut in the lathe. The inside of holes to be tapped after hardening may be protected from hardening by packing them full of a special cement before placing the work in the furnace. The cement is made by thoroughly mixing fire clay, 2 parts, water glass, 1 part, fine sand, 1 part, and enough water to make a sticky, dough-like cement.

GLYCERINE SOAP—IV.

RECIPES.

THE soap prepared by this method though inferior to the previous one, if carefully made, can hardly be differentiated by ordinary people. These methods take no setting change hence the perfection of the soap would depend mostly upon careful manipulation in as much as purity of the stuff used. In the previous issues everything has been discussed in full; now, for convenience' sake certain recipes are given below. In applying those formulas the soap maker is advised to go through the previous issues and take the methods described therein as his guiding principles.

SECOND METHOD.

Refined tallow No. 1.	4 seers.
Cochin coconut oil	4 "
Castor oil No. 1 or 2	2 "
(Rosin of the finest quality may be partially substituted for castor oil).	
Caustic soda lye 37°B	5 seers.
Industrial alcohol	5 pints.
White granular sugar	4 seers.
Water to make syrup	4 "
(Certain portion of syrup may be replaced by glycerine):	
Leather brown	5 to 10 gr.
or	
Methyl violet	5 to 10 gr.
with English brown	10 gr.
or	
Scarlet Red	2 dr.
(for red colour)	
or	
Uranium yellow	1 dr.
(for yellow green)	
Boiling water to dissolve	8 oz.
Lavender oil	3 oz.
(Lautier fils)	

Sandal oil	½ oz.
(Mysore Govt. or B. P.)	
Rose Geranium oil	1 oz.
(African quality, Bush).	
Cassia oil (China quality)	½ oz.
Artificial Musk (ambrette)	½ dr.
Alcohol to dissolve the	
musk	1 oz.

PROCEDURE.

Melt the fats and oils, strain through a fine cloth and run into a tin or iron drum or a brass or copper kettle having 14" diameter and 16" height or 10 times capacity of the fatty stock. The inside of the drum should be rubbed clean. Pour in the lye in clear solution previously strained through a clean piece of cloth. Stir with a clean stirrer until the mass thickens. Keep aside. Within half an hour saponification will begin signified by high temperature and colour of the mass which is now dark brown and jelly like to look at. Put the pan on a water bath and boil on, stirring occasionally. After half an hour crutch in 2 pints of alcohol and cover up the pan with a closely set cover. Go on boiling for an hour stirring occasionally when the soap will become flaky and saponification almost complete. Mix the syrup, (freshly prepared), well with the soap when it will turn into a fluid. Boil for one hour more stirring occasionally. Now, diminish the heat of the oven either by throwing some ashes on the burning coal or by placing a thick iron sheet on the surface of the oven, and add to the soap the rest of the alcohol. The soap will now turn into a thin fluid. Add the colour in solution and boil in that mild heat for half an hour, the pan having been well covered. Test the soap as

previously described and if found satisfactory take the pan away from fire, and incorporate the perfume. Keep aside for some time. Remove the thin crust that may be found on the surface, and run the liquid soap into special moulds. When cold, take out the soap bars, cut into pieces, get them dried, polished, stamped, and finally put into boxes.

OTHER RECIPES.

I.

Tallow	20 lbs.
Coconut oil	30 "
Castor oil	10 "
Lye 38°B	30 "
Glycerin	12 "
90% alcohol	25 "
Golden yellow	q.s.
Vetivert oil	4 dr.
Musk	10 "
Cassia oil	10 "
Sandal oil	4½ oz.
Geranium oil	10 oz.

II.

Tallow	30 lbs.
Coconut oil	50 "
Castor oil	30 "
Lye 38°B	55 "
Glycerin	12½ "
Syrup	12½ "
90% alcohol	50 "
Colour to choice	q.s.
Musk	1 dr.
Bergamot oil	3 oz.
Lavender oil	5 "
Cananga oil	8 "

THIRD METHOD.

All the ingredients are in parts by weight.

I.

Tallow	15
Coconut oil	15
Castor oil	20 :

Caustic soda solution

38°B	25
Spirit	20
Sugar	15
Water to make syrup	15
Colour and perfume	q.s.

II.

Tallow	20
Coconut oil	20
Castor oil	20
Lye 38°B	30
Spirit	30
Sugar	20
Water	20
Colour & perfume	q.s.

WITHOUT SPIRIT.

III.

Tallow	40
Coconut oil	40
Castor oil	30
Lye 38°B	55
Glycerin	10
Syrup	15

Solution made from brine of 7°B raised to 12°B by adding potassium carbonate

carbonate	36
Colour & perfume	q.s.

IV.

Tallow	25
Coconut oil	30
Castor oil	30
Lye 38°B	42½
Sugar	20
Water	20
Soda crystal	12
Water to dissolve	4
Colour and perfume	q.s.

V.

Tallow	35
Coconut oil	45
Castor oil	40
Lye 38°B	60

Solution of 8°B Brine
 raised to 18°B by
 potassium carbonate 40
 Glycerine 25
 Colour & perfume q.s.

This is the best recipe without alcohol.

Mix the lye with the molten fatty stock, and allow the mass to stand until the heat generated by chemical action reaches its highest point. Stir in hot sugar solution, and other fillers, alcohol, colouring matter, and perfume. Remove the frothy layer and pour the liquid soap into moulds. It always requires a little practice in order to make the soaps perfectly, as they do not liquefy so easily especially those prepared without alcohol. They are also inclined to be slightly turbid and grained, however they increase in transparency on keeping.

MOULDS.

These moulds may be prepared by galvanized tin sheet preferably of 24 gauge, in the shape of pipe having the diameter of the soap required. A separate cup shaped cover is closely set with one end like a mouth piece. Before pouring the fluid soap into the pipe, the cover is fitted with the end of the pipe. A thick paste prepared by fine earth or flour is pushed into the joint and a strap of cloth also smeared with the paste is tightly wrapped round the joint in 2 or 3 folds so that the fluid soap cannot escape anyhow. Thus treated the pipes are filled with the fluid soap which when cold the covers are taken away. The pipes are warmed a little and the inner soap bar is pushed out by a stick. A piece of board having the dimension of the opening may be placed against the soap at the mouth of the pipe

so that the stick may not break the soap which is not yet so hard as to resist hand pressing. Then cut the soap bars into pieces according to the size required.

UTILISATION OF THE SOAP CUTTINGS.

They may be added to a fresh charge of the same colour. A little heating will melt them readily due to presence of alcohol and syrup. When the cuttings are of different colours they may be made into a novel soap by the following manner: Dry the cuttings well, and cut into small pieces into various shapes such as triangle, cube, cone etc. Now, prepare a fresh soap by the 2nd. method without colouring matter. After the liquid soap is poured into the pipes throw these pieces into them. The temperature of the liquid soap being low at this stage the pieces of soap will remain undissolved, and thus a beautiful mosaic soap will be obtained.

ALCOHOL.

The use of alcohol, an essential ingredient for transparent soap is subject to excise license. Rectified spirit or at least proof spirit specially denatured with 10% wood naphtha or with a low percentage of castor oil and caustic soda or with any other suitable agent so as to make it unfit for drinking is permitted for the use of manufacturing transparent soap. Ordinary methylated spirit contains 1% petroleum, hence, it is unfit for soap manufacture on account of bad smell. In order to obtain the license a petition attached with Re. 1/- court fee stamp has to be made to the Excise Commissioner stating the purpose, and approximate quantity that may be annually required. Also the maximum quan-

tity to be stored up at a time has to be mentioned. In the meantime a store house for safe custody of the spirit has to be built. An inspector will then come to visit the factory and store room, and if the authorities are satisfied, the license will be granted for one year only to be renewed every year. While taking the license a bond has to be signed by the petitioner. The renewal application has to be made at the end of the session (March) with 2 as. court fee stamp and with a mention of the quantity of Spirit in stock. It is needless to say that a strict account of the spirit used has to be kept. Spirit to be used for industrial purposes is free of certain duties and hence it becomes cheaper than market price.

PURIFICATION OF RAW MATERIALS.

Raw materials to be used especially in the 2nd. and the 3rd. methods must be as clear as possible; and purer the stuff taken better the result obtained. Oils should be taken the fresh, unadulterated and the best stuff. Allow the liquid oils to stand for 4 or 5 days in a steep vessel, and when settled take away the clear oil from the surface. At this stage they need not further refining but in case of tallow even a good quality must not be used without refining, otherwise any trace of animal tissue and albumen that may remain in it being subsequently decomposed will spoil the perfume, and may even render the soap unfit for use. In order to refine tallow boil 10 srs. of it with half of its water. When ebullition takes place add $\frac{1}{2}$ ch. of lye 38°B and $\frac{1}{2}$ seer of salt. Boil on, and skim off the dirty froth. When clear, take away from fire and allow to settle.

PERFUMES.

With regard to perfumes care should be taken that the compound made may not contain incompatible elements. This difficulty often arises in using artificial

perfumes. The blending must be judicious and harmonious like a musical concert, and because it is highly difficult for a layman it is better to use a ready made compound or to rely on one prescribed by an authoritative formula. With natural perfumes one artificial perfume may however be safely used to accelerate the tone of some characteristic odour. Another important point should be noted that perfumes are mostly volatile. In order to restrain this fugitive tendency of perfumes at least a suitable fixative agent must be added to the compound. These are Musk, Ambergris, Civet, Castor, Vetivert (khus), Labdanum, Sandal oil, Patchouly oil, some balsams and oleo resins, etc. They must be used in minute doses and in alcoholic tinctures otherwise the whole compound may be spoiled.

SOME TECHNICALITIES.

Lye = Caustic soda solution.

Soap stock = fats and oils which are made into soap.

Stock soap = A soap base or in other words a soap previously prepared with which another soap has to be made.

Water bath process of boiling as opposed to direct fire boiling is, that in which a vessel containing water is placed on the oven and another smaller vessel containing the ingredients to be boiled is placed into the bigger vessel in a suspended position. Now, as the water boils the contents of the inner vessel are boiled by the moist heat of the boiling water. Like steam boiling it does not allow the soap to be charred.

38°B = The mark i.e. 38 degree indicated by Beaume's hydrometer, an instrument used to determine the specific gravity or density of a liquid, when put into it.

q.s. = quantum sufficit = sufficient quantity.

—BY R. GHOSE, (Soap Expert).

INCREASING THE CROP YIELD.

GROWTH is the most natural of all phenomena, in the life of plants no less than of animals. In nature, a seed falls and germinates, and forthwith a new plant establishes itself to partake in the struggle to live and reproduces itself. From then on it battles unassisted by any outside agency, save those of sunlight and rain, and often harassed and impeded by enemies, such as uncongenial weather, insect pests and destructive diseases. In order to protect, stimulate and encourage them for their growth it becomes essential to give the crop plants a great deal of attention so that they shall not be outdistanced by less valuable and perhaps even obnoxious weeds. And oftentimes, the more valuable the crop, the more care and protection it demands in order to withstand the exigencies of competition.

There are five kinds of operations that may be resorted to that will cause greater productivity. Not all may be required by any single crop or group of crops in any one year or season. Indeed, as far as large scale commercial agriculture is concerned, certain of them may mean too great trouble or expense to justify their use, except under emergency conditions. Nevertheless, the well-quipped farmer of to-day is more or less familiar with, and equipped for, all of them, and modern invention has devised tools and labour-saving implements with which each of them may be most efficiently accomplished sometimes in a number of different ways. The five groups of operations which we can now take up in order are: (1) the cultivation

of the soil; (2) fertilizing of the soil; (3) irrigation; (4) spraying to protect the crops from insect pests and diseases; and (5) pruning trimming with a view to modifying or controlling the growth of the crop.

THE CULTIVATION OF THE SOIL.

The shallow stirring of the soil between growing plants or rows of plants has three main purposes: the destruction of weeds with their moisture-stealing and ground-monopolizing propensities; the preservation of a mulch or loose layer of surface soil, which will prevent excessive evaporation and conserve the soil moisture; and, when needed, the hilling up of the earth around plants to support them, protect them from the sun, or prevent flooding in a stiff, poorly drained soil.

The implements of cultivation begin with the ordinary garden rake and hoe and all the larger tools and machines are simply developments of these two types. There are special purpose hoes of various styles and sizes, there are rakes with adjustable teeth of varying sizes and shapes, there are examples of both these mounted on single or double wheels which enable the gardener to cover more ground with less effort, there are larger implements horse-propelled on which the driver may ride, including sizes that cultivate two or more rows at a time, and there are also engine-driven styles, which enable a man to cover acres, instead of square rods of territory. As in the case of plows, there are both shovel and disc-type cultivators—in fact, the common harrows of these two styles are often

used to keep the ground loose after a crop is planted, but before it has come up. Again, there are modifications designed to better adapt the different machines to different kinds of crops—high-hung riding cultivators for corn-fields, built so as to pass over plants up to a foot and a half high, and lowhung implements for the stirring of the soil in orchards where it is necessary to work in under the branches of the trees.

A particularly interesting feature of many of these machines is that they are supplied with complete sets of interchangeable parts so that the blades can quickly be set so as to throw the soil towards or away from the plants, or so that the implement can be used to-day on sugar beets, to-morrow in the vineyard, and the next day in the potato field.

FEEDING THE GROWING CROPS

The problem of fertilizing the soil is, of course, one that can usually be done best when the ground is bare. But there are oftentimes when it is desirable to give the growing plants in a field a bit of encouragement, an added stimulation. Then, as always, the plant food may be supplied in dry or semi-dry form—as manure, commercial fertilizer or a mixture of chemicals, or in liquid form—perhaps a solution of chemicals or, more probably, the diluted drainage waters from a stable, barnyard or manure pile.

For the distribution of manure evenly and as lightly as desired (so as to avoid smothering a growing crop), the modern manure spreader is highly satisfactory. The bottom of the wagon box of such machines is an endless belt, chain-driven from the axle, upon which the load is gradually carried rearward to

VOL. XXV. No. 300.

be flung off and widely scattered by revolving teeth and beaters, driven at much higher speed, from the wheels. The latest models are hung close to the ground, which makes them much easier to load; also some types are so designed in the rear as to scatter the shredded manure over a strip much wider than the wagon itself. The single drawback of many manure spreaders is their heavy draft, but with a strong three-horse team or a reliable tractor to depend upon, this obstacle becomes inconsiderable.

For the distribution of dry commercial fertilizers and mixtures, a machine not unlike a grain drill or lime distributor may be used, while for smaller scale operations, there are wheelbarrow-like distributors with two, three or more finger-like tubes leading from the hopper down to the soil, so that the plant food can be strewn alongside of two rows and down the middle of the space between them.

Liquid manures, though not as extensively used in this country as in some others that have come to a fuller realization of the undesirability of wastefulness, are sufficiently employed to have led to the development of sprinklers and tanks mounted on wheeled trucks. The use of such a machine on a growing pasture or meadow invariably brings most gratifying results, and, as the material is primarily a by-product on any farm that keeps livestock, the cost can be kept at a minimum.

ARTIFICIAL IRRIGATION.

Again starting with first gardening principles, we have the common watering pot or sprinkler. A step above this is the garden hose equipped with one or

more stationary or revolving sprinklers. To avoid the bother of moving the hose about and to meet the objection that it "wears out," there have been perfected various irrigation systems involving metal piping and nozzles of various types and in different arrangements. In some cases, these pipe lines are laid along the ground; in others they are elevated on posts, both to get them out of the way of the workers in the field and to enable the streams to cover a wider strip of ground.

PROTECTIVE SPRAYING & DUSTING

Starting at the bottom once more, we may find "back-yard gardeners" spraying their half dozen rose bushes or tomato plants with a whisk broom. Where this is a bit too slow, we may choose any of a number of styles of small hand pump or syringe. A step farther brings us to the so-called "bucket sprayers," which deliver the spray solution with considerable force from an ordinary pail. An improvement on this is the knapsack type, in which the solution is carried in a tight metal container slung over the operator's shoulder. At this stage we begin to encounter the compressed air sprayer in which several rapid strokes of the pump handle create sufficient pressure in the airtight tank to produce a fine stream or spray of several minutes' duration.

There is also on the market a type of sprayer in which the pressure is provided by compressed air contained in a metal cylinder and renewed as often as exhausted. While this does away with the weight of the pumping machinery, there is the bother of changing and recharging the tanks to be considered.

Spraying, or rather dusting, with dry poisons and fungicides is a relatively recent development, but one that seems to be winning increasing favour. Of course, the use of dust sprays does away with the bother and effort of mixing and hauling liquids. If sufficient pressure is available, the dust can be well distributed and, unless washed off by rain, it appears fully as effective as the corresponding wet form of the poison. Dust sprayers, like the liquid types, are made in all sizes, from those suitable for household or backyard use to large affairs suitable for the treatment of extensive orchards and vineyards.

THE INDIAN COTTON MILL INDUSTRY.

THE Bombay Millowners' Association's Annual Mill Statement for the cotton year ending 31st August 1934 contains the names of Cotton Spinning and Weaving Mills, erected or projected; in British India and Native States, as also the names of the Agents or Owners, particulars of share capital, the number of looms and spindles erected and working in each equipped mill, the quantity of cotton consumed in candies, the average number of hands employed daily, and the average number of days worked by each mill during the year. In addition, the Statement contains statistical summaries showing the growth of the Cotton Mill Industry in the whole of India, in Bombay City and Island, Ahmedabad and the Bombay Presidency (excluding Bombay City) since the year 1933.

The Statement is divided into three parts: Part I contains detailed particu-

lars of the equipped mills in Bombay City and Island, and such particulars as are available of the mills, projected or in course of erection, throughout India, during the year. Part II contains particulars of equipped mills in Ahmedabad and that portion of the Bombay Presidency outside the cities of Bombay and Ahmedabad. Part III contains particulars of equipped mills situated in other Presidencies.

FEATURES OF THIS YEAR'S STATEMENT.

The total number of equipped mills in India, according to this year's Mill Statement, is 352 as against 344 on 31st August 1933. There is a net decrease of 3 mills in Bombay City and Island owing to the sale or scrapping of the machinery in the Bomanji Petit Mills, the Framjee Petit Mills, the Jivaraj Baloo Mills and the Sewree Cotton Mills, and the addition of the Bhawani Cotton Mill. The number of mills in Ahmedabad remained the same at 82. The number of mills in the Bombay Presidency, exclusive of Ahmedabad and Bombay City and Island, increased from 60 to 62. In Bengal the number of equipped mills is now 22 as against 19 last year, the Bangodaya Cotton Mills, the Basanti Cotton Mills and the Hoogly Mills having commenced work during the year. There was no change in the number of mills in the United Provinces, and Central India, but the number of equipped mills in the Madras Presidency increased from 28 to 32 as the Lakshmi Mills, Pankaja Mills, Sri Ramalinga Choodambika Mills and the Sri Satyanarayana Spg. Mill commenced working. The opening of the National Cotton Spg. & Wvg. Mills in Delhi increased the number of mills in

Delhi by 1. There was no change in the number of equipped mills in Mysore, Pondicherry, Burma, Rajputana, Central Provinces, Berar or the Punjab. Out of the 352 equipped mills in the country, 29 were completely stopped during the whole of the year to which the Statement relates. Of these 29 mills, 14 were located in Bombay City and Island. Since the Statement was prepared, the number of idle mills in Bombay City and Island has decreased owing to the reopening under new ownership of some of the mills which were formerly under the agency of Messrs. Currimbhoy Ebrahim & Sons, Ltd.

SPINDLES AND LOOMS:

The total number of spindles in the equipped mills of the country now stands at 9,613,000, an increase of 41,000 during the year. The total number of looms is 194,988, an increase of 6,000 during the year. In Bombay City and Island, the number of spindles fell to 31.7 lakhs from 33 lakhs, and the number of looms from 73,000 to 70,000. In Ahmedabad, the number of spindles increased by 31,000 to 2,010,000 and the number of looms increased from 47,200 to 49,900. In Bombay Presidency, exclusive of Ahmedabad and Bombay City, the number of Spindles and looms increased by 27,000 and 2,800 respectively. In the United Provinces, the numbers of spindles and looms were respectively 640,000 and 9,100; the number of spindles is slightly lower and the number of looms is slightly higher than last year's figure. In the Madras Presidency, there was an increase of 98,000 spindles and a decrease of 250 looms during the year, the total figures on 31st August 1934

being 942,000 spindles and 5,300 looms. In the Central Provinces, there was no change in the number of looms, but a very slight increase in the number of spindles, the figures at the end of the year being Spindles 308,000 and looms 5,723. In Central India, the number of spindles increased by 12,000 to 325,000 and the number of looms by 432 to a total of 8,771. In Bengal, the number of spindles dropped by 3,600 to a total of 330,000, but the number of looms increased by 1,000 to a total of 7,000. In Hyderabad (Nizam's Territory) the number of spindles increased by 20,000 to a total of 1,24,308, and the number of looms increased by 1,100 to a total of 2,694. The changes in the number of spindles and looms in other centres of the industry were insignificant.

PAID-UP CAPITAL.

The total paid-up capital of the Industry on the 31st August 1934 amounted to Rs. 39,22 lakhs, a drop of Rs. 43 lakhs compared with last year. In Bombay City and Island, the total paid-up capital of the completely equipped mills fell by Rs. 66 lakhs to the figure of Rs. 13,31 lakhs.

SPINDLE AND LOOM ACTIVITY.

The activity of the Industry as compared with the previous year is reflected in the figures of cotton consumed. In the year ending 31st August 1934, the Industry consumed 1,352,000 candies of cotton as compared with 1,419,000 candies in the previous year. In Bombay City and Island, the drop in consumption was relatively more severe than in other parts of the country, 306,000 candies having been consumed in 1934 as compared with 399,000 candies

in 1933 and 460,000 candies in 1932. This fall in cotton consumption by Bombay Mills was partly due to the strike and the closure of the Currimbhoy group of mills. The average number of spindles working daily during the year was 7,845,000 out of a total of 9,613,000 erected. Last year, the corresponding figures were 8,202,000 working out of a total of 9,572,000 erected. Of the 195,000 looms erected, an average of 159,000 were working daily during the year. This compares with the figure of 162,000 working daily in the previous year. In Bombay City and Island, only 2,043,000 spindles and 49,000 looms out of 3,170,000 spindles and 70,000 looms were working regularly. It should, however, be noted that the above-quoted figures of spindle and loom activity do not include night shift working.

The number of operatives employed daily on day shift work was approximately 385,000 as against 400,000 in the previous year. Particulars of the numbers regularly employed on night shift work are not available.

Never place a sponge in the sun to dry, as this will cause it to rot.

A mixture of soapy starch and milk will remove stains from mildewed linen.

To brighten up an oil cloth rub with a rag wrung out in turpentine. Beeswax and turpentine makes a good floor polish.

Use milk for washing leather furniture; apply with a soft cloth, then rub gently with another cloth to polish.

Patent leather shoes which have become dull will be brightened by the application of turpentine.

THE ART OF CANVASSING.

THE business of canvassing when done intelligently and systematically never fails to be paying. But the canvassers themselves should be mentally and habitually equipped for the trade in which they find themselves engaged.

A perpetual problem for the average canvasser or travelling commercial agent when calling on a customer is how to create that pleasant mutual feeling which is so essential to successful salesmanship. Whilst always remember that business must be kept uppermost, he needs also a secondary interest to share and enjoy with his customer.

To talk business at the start and relinquish all hopes of it at the first sign of indifference on the part of the prospect does not imply good salesmanship. The subject should be managed tactfully and the talk continued to inspire interest in the merchandise you have to offer. Hence some minor subject may be used to introduce or to conclude the main theme of business. It frequently happens that this pierces indifference, delays or averts unfavourable decision, gives the customer time to consider more fully whether he can readily give or enlarge an order or not.

Many canvassers understand this trait of human character and hence they shrewdly aim at getting to know a man's personal likings, views, recreations and in some cases his friendships. On knowledge of this kind business friendships are built up. The commercial agent almost automatically and perhaps almost unconsciously gets keener to put a cus-

tomers who is also a friend on to a good line.

The canvassers should bear it in mind that the retailer is strongly inclined to go a good deal out of his way to give an order to his canvasser friend. Such friendships of course are usually of slow growth taking in most instances years to ripen but the process can be hastened considerably by the tactful commercial agent who plans and works to do so.

CULTIVATE BUSINESS FRIENDSHIP.

It is a common fact that business friendships like social friendships are based on intimacy developed by mutual understanding. Mutual understanding depends on the exchange of ideas. Hence the slowness or the rapidity with which you build up a number of business friendships will depend mainly on your success in securing your customer's confidence.

It is necessary to express yourself and to get his expressions on matters aside from business. You must impress your ideas upon him and be receptive to the suggestions which he can be induced to offer. Few canvassers can do both but he who can has a great advantage. There is a side entrance to everyman's inner feelings. The key may be hard to find at first but it exists. There is no need for the commercial agent to be very supple. On the contrary, considerable value often lies in antagonistic remarks if tactfully offered. They increase the interest and thus keep the ball of conversation rolling.

One canvasser who is a sportsman may contrive unobtrusively, for example, to make this fact not only plain

but interesting as well to nearly every customer whom he calls upon. Though every retailer friend is not interested in sports, he may have sportsmen friends and so becomes interested indirectly but none the less surely interested in the traveller's enthusiasm for his hobby.

So that even when, perhaps, the commercial agent in question is far away, if the subject of sports crops up for conversation, the canvasser's name crops up, too, and this is the best advertisement he could possibly have. His advice and views are recalled and discussed very often with the result that some little problem or knotty point arises which he will be called upon to solve next time he is round.

ALL-ROUND BUSINESS ACQUAINTANCE.

A wide knowledge of market prices acts often as very useful to the canvassers. We know of a canvasser who scores by always having some peculiar information to give about the market. Apart from the exigencies of the moment he invariably lets fall a few uncommon reasons for the rise and fall of prices. Without pressing them as reasons for buying, he offers illuminating explanations by going into the origins and by considering the subsidiary influences which affect the price fluctuations of the day. As comparatively few retailers dig very deeply into these matters and yet are glad to get such knowledge, his method of impressing his personality upon his customers is very telling.

A relation of the methods of successful retailers has won many business friends for the canvasser. Without any breaking of confidence and without posing as an authority he contrives to keep

his patrons well posted in up-to-date methods for stimulating trade. Keen retailers are always glad to get such information and they are duly grateful. Remarks that aid business are valued by them and the canvassers who can use them in a graphic manner find invariably that their order books have benefitted accordingly.

The fact of being an enthusiast on advertising, writes Mr. M. C. Mogg in **SYSTEM**, is of great help to a travelling canvasser who has studied the subject thoroughly enough to become an authority upon it. His advice on this great trade compelling power is so valued that he is often asked for it by many of his customers. And even those who do not seek advice, nor show entire appreciation by following it are nevertheless interested. This interest makes them enjoy his talk and the retailers who enjoy a canvasser's talk usually do all the more business with him.

REVIVING CUSTOMER'S INTEREST.

Subsidiary efforts made continually to do something out of the ordinary to revive customer's interest in the canvasser is always productive of much good. The customer may be called upon from time to time, and occasionally special letters may be written to the retailer friends about some subject which is of particular interest to them. Picture postcards, calendars or some other souvenirs may also be sent sometimes and such acts are generally much appreciated and often bring in good returns.

Small presents can also be made with good results. Advices may be sent to the customers by post about real bargains going in the shops and ware-

houses and which are likely to be all sold out before the canvasser is able to get round again. Such troubles taken are duly appreciated and thus some canvassers get hold of bargains which they would otherwise miss.

VALUE OF KEEPING RECORDS.

A commercial canvasser gets trade and prestige by keeping a careful, accurate, condensed record of the customer's past purchases—and by reminding them thereof. This is not a very common practice among canvassers. But it is a good policy, being of great advantage to the many small buyers who do not keep complete records.

It is useful also to many shopkeepers who even if they have perfect records of past buyings may not have time or disposition to look them up when the canvasser calls. By keeping a well posted record he is able when starting on a journey to carry cards relating to customers on whom he is about to call.

The discipline of doing the work of recording and the possession of all vital historical facts in his pocket strengthens all his powers of persuasion. Besides this it gives the salesman a clearer air of confidence. The differential reminders which he consequently offers his customers are welcome. They are a guide to the salesman and the buyer as well.

To say, "You bought so much, so many of these goods, so much, so many of those goods, last time"—last year or two, three, four or five years ago is to interest the retailer keenly. It referesh-

es his experience thereby inducing him to volunteer reasons why he should repeat or deviate from past purchases. He is thus more interested in the salesman's talk and by becoming more dependent upon his help is more interested in the salesman himself.

HOLDING CUSTOMERS.

The problem of attracting and holding customers requires much tact that is based on a knowledge of human nature. An apparently trivial matter disgruntles many a customer to the point of seeking his trade elsewhere. Trifles that are in themselves of apparently slight moment develop into conditions of vital importance and all salesman and canvassers who want to build up permanent business as contrasted to the transient trade done by many should look sympathetically into these tremendous trifles.

Above all the description of the goods they want to dispose of should not be overdone; for honest dealings and correct representation of the things go much to lay the foundation of solid business. No canvassing, however, planned it may be, can push on the sale of goods which do not possess real merits and cannot bear comparison with similar goods of rival business firms. The points we refer above are useful to those who combine in themselves besides the qualifications of ordinary canvassers the courage of conviction on their goods and suggest how they can create interests in their prospects in a manner that will finally end to mutual benefit and business.

IN THE INSURANCE FIELD.

BY OUR INSURANCE COMMISSIONER

Social Insurance in India.

Every civilized country of the modern time has recognised the need for an elaborate and comprehensive scheme of social insurance, although the measure of success achieved in this regard varies in different countries. Benefits of social insurance are, of course, offered by the Government of the respective countries, and cover such fields as workmen's compensation, insurance against old age and invalidity, widows and orphans' insurance, insurance against sickness of labourers and agriculturists, unemployment insurance, etc. These provisions were first characterised as socialistic, but every government which seeks to survive the struggle of existence has made provision for social insurance benefits for its peoples. Social insurance has very much developed in Europe and America. In the East, however, Japan has achieved a lot in the matter of Social insurance, particularly workmen's compensation and sickness. India rather lags behind in this respect. Although the amendment of the Workmen's compensation Act in 1933 has brought in important reforms bestowing increasing benefits to the workers of all classes, but there is the lack of any comprehensive policy or programme designed to bring the multifarious benefits of social insurance within the reach of the masses. The incidence of sickness and disablement is much higher in India than in Europe, principally due to climatic conditions, but provisions against these have been but few. The Witley Commission recommended that in view of the chronic indebtedness of Indian workers due in a large measure to expenses involved by illness, all methods that may lead to the alleviation of existing hardships should be explored. It is argued that there are great difficulties in the way of working special insurance schemes on any large scale in India, e.g., the largeness of num-

bers involved, the financial limitations of the Government, and also the administrative difficulties, none of which, however, seems to be convincing.

Sickness Insurance.

Let us first of all take up the question of sickness insurance in India. By sickness insurance, it is meant here insurance for industrial labourers or other kinds of workers who fall ill. The only form of benefit available to such workers upto the present time constitute treatment free of cost in the hospitals of the particular workshop concerned or some state-public, local-fund or private-aided hospitals. If we look into the hospital statistics, we find how limited is the scope for indoor treatment of a large number of sick and ailing persons who are refused admission on reasons of limited accommodation. Except in a few establishments, the provision for a regular payment of the labourer's wages or a part thereof during his illness is conspicuously absent. Moreover, it becomes extremely difficult for the sick person to get back his job after he had recovered from illness. In the year 1930, the total number of patients treated in the state-public, local fund and private-aided hospitals all over India was 57,442,916 of which 56,467,952 were outdoor patients. These figures include cases of civil population also. But this unmistakably shows the hopeless lack of adequate provision even for those people who find hospitals and dispensaries within their reach. There are such remote places, and in no small number, where medical aid is absolutely unknown. In 1930, the total amount spent by these hospitals amounted to Rs. 4,14,57,880, of which the Government's contribution was Rs. 2,12,05,658, a little more than 50 per cent. But how inadequate is the sum

SMALL TRADES & RECIPES

Depilatory Liquid.

Sodium sulphide	7	per cent.
Glycerin	10	" "
Water	80.5	" "
Alcohol	2	" "
Perfume	0.5	" "

Dissolve the sodium sulphide in some of the water, add the glycerin and mix. Add the remainder of the water and finally the perfume, dissolved in the alcohol, mix well and filter. The strength of this depilatory can be increased by increasing the percentage of sodium sulphide but in no case should it exceed 10 per cent.

Household and Office Paste.

A paste that is suitable for office or home use and is pliable when dry can be made by beating to a paste corn starch, 4 oz., white dextrine, 2 oz., and cold water, 10 oz. An egg beater may be used to work the ingredients to a smooth, even consistency. In a separate container, dissolve borax, 1 oz., in boiling water, $\frac{1}{2}$ gal., and add glycerine, 3 oz. After stirring the solution, the starch paste is vigorously stirred into it with the egg beater until the paste is smooth. This paste may be used for fastening paper, leather or fabric. If a few drops of 10 per cent carbolic acid are added to the borax solution before stirring in the starch mixture, the paste will keep well. A less expensive paste that is serviceable for many purposes is made by working ordinary flour, 2 lbs., into an even paste with cold water, 1 qt. Care must be taken to break up all lumps completely. In a separate container, dissolve alum, 1 oz., in hot water, 4 oz. To complete the paste, slowly pour the flour paste into boiling water, 3 qts., while stirring vigorously. When the proper consistency has been reached, add the alum solution and stir to complete the paste.

Dry Cleaning Fluids.

An excellent dry-cleaning fluid that combines the efficient grease-dissolving powers of naphtha and carbon tetrachloride is made by mixing carbon tetrachloride, 3 gal., deodorized cleaners' naphtha, $1\frac{1}{2}$ gal., benzol, 24 oz., and chloroform, 2 oz. A slightly less expensive cleaner of the same type that is suitable for most purposes, may be made by mixing carbon tetrachloride, $3\frac{1}{8}$ gal., deodorized gasoline, (not Ethyl gasoline) 3 gal., and chloroform, 2 oz. Still another cleaner that is exceptionally quick acting and combines the detergent action of soap with the grease-dissolving ability of solvents is made by mixing diglycol oleate, 1 oz. and water, 1 oz. This mixture is then stirred into a solution of butyl cellosolve, 1 oz., isopropyl alcohol, 10 oz., and carbon tetrachloride, 14 ounces.

Utilizing Cotton-Seed Hulls.

Instead of treating the hulls as refuse or burning them for fuel, potash and phosphate of lime can be extracted from them by the following process. The hulls are first burnt and the resulting ashes boiled for two hours in about ten times their weight of water. Then gradually add about half the weight of slaked lime to the boiled solution and allow it to settle. The clear liquid is next drawn off in any suitable manner. The residue is then put in a percolator and exhausted with water, and the solution is added to the clear liquid, and both evaporated to dryness, after which the potash is fused and run into moulds. The process of exhaustion is repeated and the subsequent washings are used to dissolve the next batch of ash and to slake the lime. The residue left in the percolator contains 50 per cent. of phosphate of lime.

India's Industrial Progress.

Kashmir Potteries.

It is understood that the Government of Kashmir and Jammu have been encouraging and actively assisting all local industries. This step is taken with a view to relieving unemployment in the State. Recently they have granted concessions to two State subjects to get the requisite training in pottery and then to start pottery in the State. All facilities are given to them so that they may be really useful in introducing and developing a new industry. It is a matter of deep gratification that while British India is apathetic towards the industrial needs of the country, Hyderabad, Baroda, Mysore and Kashmir are fastly developing materially.

Smokeless Oven.

Cheapness, simplicity and efficiency are the main characteristics of a new type of domestic oven with which Dr. H. K. Sen is experimenting in the workshops of the Applied Chemistry Department of the University College of Science, Calcutta.

One of the principal objects aimed at by Dr. Sen is the abatement of the smoke nuisance, while the principles incorporated in his design enable the user to procure from the fuel burnt a supply of good quality gas that may be utilized for heat, light or power.

In the experimental plant working at the College 16 lbs. of coal were "coked" in three hours, producing 23 ozs. of tar, 11 lbs. of coke and 36 cubic feet of rich coal gas which was used to operate a

gas engine. Over the fire itself ordinary domestic cooking was done.

Another important point emphasized by Dr. Sen is that the installation, which is well within the means of middleclass Indian families, is almost entirely smokeless, thus eliminating a pernicious cause of prevalent respiratory diseases.

The utility of Dr. Sen's device ranges from domestic to semi-large scale firing. It consists of two concentric cast iron cylinders, conical towards the bottom, the inner resting on the outer, and the joint at the top being gas-tight. The inner cylinder has a grating attached to it in which coke is burnt, while the annular space is filled with coal or coal dust. A light cover separates the annular space from the inner cylinder, and the outer cylinder has a delivery pipe leading through a water cooler to a gas holder.

When the coke burns in the inner oven its heat distils the coal in the annular space, giving rise to tar and gas. The tar collects in a pit, and the gas in the gas reservoir. When the central core is raised the coke is discharged from the annular space, refilled with coal and the process continued.

A New Weaving Institute in Delhi.

In order to promote industrial and technical education, it has been decided to establish a Government institute for weaving, dyeing and calico printing in Delhi. No fees will be charged to students belonging to the Delhi province. Rent-free accommodation will be provided to students desiring to live in the hostel.

Scientific & Technical Topics.

Wool from Rocks.

The Canadian Department of Mines have conducted successful experiments for the manufacture of rock wool from mineral deposits in the Niagra Peninsula of Ontario. It is used as an insulator for all types of buildings and for numerous industrial purposes where it is not subject to excessive vibration. Because of its being proof against fire and vermin, it is particularly suitable for auditoria, offices, theatres and radio stations. It is long-fibred and flexible.

Artificial Blood.

As a result of researches in an American laboratory it is claimed that a substitute for human blood has at last been found. The "blood" is obtained from the vegetable juices of a plant known as the liana shrub, which grows plentifully in tropical climates. It is stated that it closely resembles human blood and that it can be used in cases of blood transfusion. Chlorophyll, the colouring matter in plants, bears a great similarity to the haemoglobin in human blood, but hitherto it has not been regarded as possible to use it as a substitute.

If the discovery is all that is claimed for it the dangers of blood transfusion will be greatly mitigated and the work of the hospitals much simplified. At present transfusion is attended by many difficulties and dangers. There are four marked groups of human blood, one of which is

decidedly rare, and there is often a serious delay in finding a person willing to give blood who is not only in a fit physical condition but belongs to the right "blood-group." Blood taken from a wrong group will administer a severe shock and may result in the death of the patient.

Quality of Eggs is Improved by Electric Cooler.

Rapid cooling of eggs to remove body heat is one factor in maintaining their fresh qualities and this is accomplished quickly and inexpensively with the aid of an electric cooler accommodating two buckets of eggs at once. It consists of a sheet metal box with two openings in the top and another in one end. A small electric fan draws air from the end opening and blows it through the two top openings. In the bottom of the box is a quart of water which is drawn up into blotters hung vertically, the process of evaporation aiding in the cooling. The buckets containing the eggs are equipped with screened bottoms and the cooled air is blown up through the bottoms and around the eggs.

Driving A Motor By Sunlight.

Sufficient energy to work an electric motor can be obtained direct from sunlight by using a new photo-electric cell, far more sensitive than the usual type, which has been produced by the General Electric Company in the United States.

Even the light from an incandescent lamp, falling on this new cell, is sufficient to operate the motor. Four of the cells, connected together, operate a motor rates at 4/10,000,000 ths. of a horse-power. Enough light energy is converted into electricity when a 75-watt incandescent lamp is lighted at a distance of 8 inches from the cells so that the motor, using 3/10,000 ths. of an ampere of current, turns at a good speed.

The photo-electric cells are of the selenium type, with light sensitive surfaces which measure approximately 2 square inches each in area. Over the selenium is a film of platinum, so thin as to be semi-transparent. This film increases the sensitivity of the cell in its response to light.

The efficiency of the new light-sensitive cells is of such an order that 1 watt of power can be obtained from about 20 square feet of cell area in direct sunlight. The cells have about 20 per cent of their effectiveness in the ultra-violet region, and the remainder in the range of visible light.

The tiny motor is of special construction, with jewel bearings and other features to reduce friction and other losses to a minimum. In the laboratory the cells have been connected in parallel when used to operate the motor with incandescent light, and in series when used in sunlight.

The speed at which the motor turns depends upon the amount of light received by the cells. Direct sunlight whirls the motor at about 400 revolutions per minute, but even sky light on a cloudy day, through a laboratory window, is sufficient to turn the motor rapidly.

No practical applications for the sun-driven motor have been undertaken, for its rating of 4/10,000,000 ths. of a horse-power which might be compared to one flea-power, or less—is too low to be of immediate practical use.

Weather Windows.

A pane of glass in your dining-room window can be converted into an original barometer in the following way: Make up a solution of cobaltous chloride (1 part), gelatine (10 parts) and water (100 parts), paint it on the inside of the window and allow to dry. The window will be colourless when wet weather is at hand, changing to blue in fine clear weather. If you use cuprous chloride instead of cobaltous chloride your "weather window" should turn yellow at the approach of fine weather, and colourless when rain is near.

Heart-Beat Snaps.

Doctors are now able to take photographs of a patient's heart-beat by means of a portable instrument called the electrocardiograph. This device works so unobtrusively that it dispels the nervousness which attacks so many people when they are sounded by means of the stethoscope. It also enables the doctor to keep a permanent record of the condition of the patient's heart.

The instrument is operated simply by attaching contacts to the patient's wrist and leg and turning on the current. The beat of the heart is then transmitted through an electric beam equipment and appears in the form of a zig-zag line on a sheet of frosted glass, where it may be photographed and filed for future reference.

Formulas, Processes & Answers.

Japan Wax.

2779 R. K. B., Amritsar—Wants to know something about Japan wax.

Japan wax is obtained by boiling the berries of several trees of the genus *Rhus*, from the incisions in the stems of which flows the Japan lacquer varnish. It ought properly to rank as a fat, for it consists almost entirely of glycerine palmitate, and yields glycerine upon saponification. Its sp. gr. is 0.984-93 and its melting point 120°F. It is used as a substitute for beeswax.

Transparent Paints for Glass.

2959 M. Y., Bhimavaram—Wishes to have recipes for preparing paints for glass.

Shellac varnish, made with bleached shellac, can be tinted with any of the various aniline dyes. The glass should be warmed first, if possible, and the powdered dyes used. If required to coat the whole of the glass, pour the coloured varnish on and then drain it off at a corner. This gives better results than a brush.

Another method is to mix ordinary turpentine 1 part, with Venice turpentine 2 parts, and well rub into this Prussian blue, Crimson lake, or Indian yellow (or any admixture of these).

Removing Iron Stains from Cloth.

3037 B. P. G., New Delhi—Wants processes for removing stains of iron, tea, and blood, from silk and wool.

In order to remove iron stains from cloth work the stain with 10 per cent. solution of oxalic or tartaric acid and gently rub it. Wash it in ordinary water, soap and dry or work the stain in dilute hydrochloric acid for 3 minutes and wash with water. The stain will be removed.

Removing Tea Stains from Silk and Wool.

The stains are of a light brown colour which are removed either from silk and wool by working the stain in 5 per cent. borax solution, wash and squeeze and dry.

Removing Blood Stains from Silk.

If the stain is formed of fresh blood first wash the stain with soap solution then wash thoroughly with water. Apply oxalic acid of 1 per cent solution and let the garment lie for about 5 minutes. Wash well. Work it in 2 per cent solution of potash permanganate for 10 minutes. Squeeze and without washing work it in sodium bisulphide solution in which a little sulphuric acid is added. By this treatment the stain of blood will be removed.

Now for removing old blood stains work the stain in 5 per cent. oxalic acid solution for 10 minutes. Then wash and treat with permanganate and bisulphide as before.

Plaster Casting.

3044 T. S. N., Bangalore City—Desires to learn a process of plaster casting.

The model (of clay or otherwise) is first covered with a layer of good plaster of paris, mixed, or "gauged," as plasterers call it, to the consistency of batter, and coloured with a little red or yellow ochre. This layer should average about $\frac{1}{4}$ in. thick. It is best applied with the pewter or metal spoon used to mix the plaster with. The plaster is mixed in a basin half full of water, into which it is sprinkled by the hand; when the plaster reaches the surface of the water it is about sufficient, but experience soon teaches the right proportion. The mixed plaster can be jerked by a dexterous twist of the spoon into the deep undercut places, and care must be taken not to inclose bubbles of air. A practical moulder would place the clay slab in a vertical position, as he would see the process of his work better. A large model would require several mixings of plaster, as when the plaster begins to set or harden it is useless for moulding. When the first coloured coat of plaster is hardened a wash of clay water should be applied nearly all over it, and the second coating, which may be of coarser stuff, put on to the thickness of about 1 in. If the mould is very large, some strips of iron nail rod, $\frac{1}{4}$ in. square, may be imbedded in the back of the mould to prevent warping. When the mould is set hard it must be turned over and the clay picked out. If the work has been moulded on a board or slate, or best of all, on a plaster slab, it may be necessary to pass a wire between the clay and the board to separate them. When the mould has been well cleaned and washed with a soft brush it should be soaked in a tub of water until quite saturated through and through, drained,

but not wiped, and a sufficient quantity of superfine plaster, carefully mixed, poured into it, and, by moving the mould about, carefully distributed all over. This may be backed with coarser plaster and strengthened with iron rods, which in this case should be painted or coated with a varnish of rosin and tallow. When the cast is set hard the most difficult part, called "knocking out," begins. A light mallet and a carpenter's firmer chisel, by a few dexterous strokes applied upon the edge, will separate the coarse outer backing of the mould, prevented by the wash of clay water from adhering to the first coloured layer. The cast should then be placed upon a soft elastic bed—an empty sack folded is as good as any—and by gentle taps, holding the chisel perpendicularly, or nearly so, to the face of the work, the coloured plaster may be snapped off, sometimes in large, sometimes in minute pieces, the colour preventing the operator chipping away the best part of his work, which may happen when mould and cast are of one colour. A chisel 1 in. or more broad may be used for the first rough work; smaller will be required for delicate parts.

A figure in the round may be moulded by the same process, but the mould must be in 2 parts. A strip of clay 1 in. or so wide must be fixed all around the clay figure, to be removed when the first half of the mould is done. The edge of the first half must have sunk holes, made by any convenient steel modelling tool, to insure the fitting of the two halves in the mould. Projecting limbs must be cut off with a fine wire and cast separately. If an iron support enters the back of the model a little clay must be put round it,

close to the model, to enable the iron to be drawn through the mould, and the hole in the mould stopped up with plaster. The two parts, carefully saturated and bound together, may be about half filled with well mixed superfine plaster, as thick as cream, which, by carefully turning and inclining the mould, can be made to cover the whole of the mould, leaving a large hollow to be filled with a coarser plaster, in which a painted iron rod may be inserted. Good plaster smells sweet, sets in 10-20 minutes as hard and as crisp as loaf sugar. Bad plaster smells of sulphur and never sets hard. Beginners must make sure of their materials, and even then should try their hands on unimportant work.

Ferro-Prussiate Paper.

3051 A. E. de S., Ambalangoda—Wants a process of preparing ferro-prussiate paper.

I.

Dissolve in 100 parts of distilled water 10 parts of sesquicarbonate of iron, and 5 of tartaric acid. Paper dipped in this bath and exposed, after drying, under a transparent drawing gives, on development with yellow prussiate of potash, a blue negative.

II.

Dissolve 10 parts of ferric-ammonium-citrate in 100 of distilled water, and 10 parts of red prussiate of potash in 60 of water, and mix the two solutions. Paper dipped in this and, after drying, exposed to light, gives a blue negative, which is fixed by simply washing it. The prepared paper should be kept in a dry plate.

Manufacture of Camphor.

3069 L. C. B., Ludhiana—Wishes to know the process of manufacturing camphor.

The camphor is generally obtained from a species of tree found chiefly in the Island of Formosa. To extract camphor the wood is cut into small pieces and boiled with water in iron vessels, which are covered with large earthen domes, lined with rice-straw. As the water boils, the camphor is volatilised along with the steam and condenses on straw. The crude product is then purified. In order to purify it, 100 parts of crude camphor are mixed with 2 parts each of quicklime and animal charcoal and the mixture is put into a glass vessel placed over a sand bath. The heat is then continuously applied, the camphor is sublimed off and deposited on the upper part of the vessel. When the process is complete, the vessel is removed and allowed to cool.

Freckle Lotion.

3141 S. M. N., Bombay—Wants recipes for preparing freckle lotion, bleaching, face creams, etc.

Potassium chlorate	1.2	parts.
Borax	1	part.
Potassium carbonate	3.7	parts.
Sugar	3.7	"
Glycerine	9	"
Rose water	20	parts.
Alcohol	10	"
Distilled water	51	"
Perfume	0.4	part.

Make separate solutions of the potassium carbonate and potassium chlorate and borax with small quantities of water. Dissolve the sugar in the remain-

der of the water. Add the glycerin and rose water; mix, then add the other solutions individually, mixing before each addition. Add alcohol and perfume.

Bleaching Face Creams.

Ethyl ether of diethylene glycol	43 per cent.
Stearic acid	9 "
Potassium hydroxide	1.5 "
Distilled water	4.5 "
Talc	27 "
Titanium dioxide	6 "
Zinc peroxide	8 "
Perfume	1 "

Dissolve the potassium hydroxide in water. Add the solution to the diethylene glycol. Heat the mixture to 80°C, and stir in the melted stearic acid. Mix the talc, zinc peroxide and titanium dioxide and add it to the above mixture and mix steadily until the paste is free from lumps. Add the perfume

Eau de Quinine Tonic.

Eau de Cologne	10
Alcohol	70
Glycerin	4
Tincture of cinchona	4
Tincture of quillaia	6
Rose water	6

Add the tinctures to the alcohol and then add glycerin, Eau de Cologne and rose water. Mix and filter.

Nail Polish.

3161 T. R. Hyderaad—Wishes to have formulas for making nail polish, dye soap, ink tablets, etc.

Pyroxylin	10 parts.
Amyl acetate	15 "
Ethyl alcohol	25 "
Acetone	50 "

Mix the last two ingredients, add the first and allow to stand until dissolved. Stir in the desired colour and perfume and filter.

Hair Tonic.

Bay rum	20 parts.
Fluid extract of sage	5 "
Tincture of capsicum	1.5 "
Quinine sulphate	13 "
Menthol	0.1 "
Chloroform	4
Alcohol	5
Water	62.85
Perfume	.25

Dissolve the quinine sulphate and the menthol in a mixture of the chloroform and alcohol. Mix the fluid extract of sage with the bay rum, add the tincture of capsicum and perfume. Mix the bay rum solution with the water, add the quinine sulphate solution. Allow to stand three days and filter.

Dye Soap.

Dye soap is prepared by taking 1 lb. of commercial white or coloured yellow soap, mixing with it aniline 1 dram, and dissolving it in 2 oz. of gin and 2 oz. of water, then working up the mass in a clear paste and moulding it into the desired shape with stamps on.

Ink Tablets.

BLUE-BLACK.

Logwood extract	100 parts.
Potassium chromate	1 part.
Gum	10 parts.
Indigo carmine	20 "

Mix and press into tablets. This gives a beautiful ink.

BLACK.

Nigrosine	4 parts.
Sugar	4 "
Dextrine	2 "
Soluble starch	q.s.
Mix and press into tablets.	

BLUE.

Chinese blue	3 lbs.
Oxalic acid	1½ lbs.
Liquid gum arabic	1½ lbs.
Thoroughly mix oxalic acid with the blue, add gum and press into tablets.	

RED.

Eosine	4 parts.
Dextrine	2 "
Sugar	4 "
Mix.	

Purification of Graphite.

3163 L. R. J., Tikari—Desires to know a process of purifying graphite.

The process of purifying graphite consists in introducing 14 parts of coarsely powdered graphite, previously mixed with 1 part of its weight of chlorate of potash, into 2 parts of concentrated sulphuric acid, which is heated on a water-bath until the evolution of acid fumes washing and the graphite is dried. This substance when heated to a temperature approaching a red heat, swells up to a voluminous mass of finely divided graphite. This powder, which is quite free from grit, may be afterwards consolidated by pressure, and used for making pencils or other purposes.

Lemon Cream.

3254 D. N. R., Hospet—Wants a formula for preparing lemon cream.

Tincture of senega	1 oz.
Almond oil	2 oz.

Glycerine	4 dr.
Lime juice	2 oz.
Rose water	4 oz.
Oil of lemon	20 drops.
Oil of bergamot	10 "

Shake the first two well and add glycerine, lime juice and rose water. Finally perfume with essential oils.

If the lime cream becomes rancid add 4 grs. salicylic acid to each pint of the cream.

Graphite Crucibles.

3301 L. C. B., Ludhiana—Desires to learn the process of making durable graphite crucibles.

Many attempts have been made to improve the durability of graphite crucibles for use at high furnace temperatures. Coatings of various oxides, applied in a state of ordinary fine division and bounded with an organic adhesive have been tried, but such coatings flake off at high temperatures, and may serve both to contaminate the melt and to attack the crucible. The use of silica, with a view to the formation of silicon carbide as a protective coating, has been tried in various ways. Thus, Helberger has suggested introducing powdered silica into the empty crucible, and then heating it to a very high temperature with a view to bringing about the formation of the carbide. An improved method, for which remarkable results are claimed, has been described by M. K. Hoffmann in the *Zeitschr. f. Elektrochemie* in one of its issues. The crucible is first dried at 150°C, and is then soaked for several hours at room temperature in a colloidal solution of silica or preferably vanadium pentoxide. On subse-

quent heating to very high temperatures the colloidal oxide which has been absorbed by the graphite is converted into carbide. This process is repeated two to four times. Any ordinary oxide which may appear on the surface of the crucible is removed. For a crucible thus treated it is claimed that a life of 110 hours was obtained at a temperature ranging from 1830° to 2000°C; whereas a similar crucible untreated only lasted for 40 hours at temperatures ranging between 1700° and 1840°C. While it is obvious that this type of treatment is only permissible where the substances to be melted in the crucible do not react with the silicon or vanadium carbides, it is evident that considerable advantage is to be gained by treatment of this sort, where such reactions do not occur.

Toys of Saltpetre.

2739 N. H. G., Calcutta—Wants a process of making toys of saltpetre.

Make a hot super-saturated solution of saltpetre and fill in the hollow wooden moulds like the sugar toys manufactured on the occasion of Dolejatra Festival. The article is then taken out of mould and dried in the air.

Cement for Iron Articles.

3097 V. S., Bezvada—Wishes to have a recipe for preparing cement for iron articles.

Litharge	2 parts.
Powdered slaked lime	1 part.
Sand	1 part.

Rub the ingredients in a mortar as fine as possible and then mix the mass with a sufficient quantity of hot linseed oil varnish to form a stiff paste. This

cement must be used while fresh and warm.

Powered Glove Cleaner.

2748 M. D. C. D. W., Rawalpindi—Wishes to have formulas and processes for preparing glove cleaner and dyeing chamois leather.

Cream of tartar powdered	480 parts.
Soap bark	160 "
Whiting	96 "
Oil of birch tar	12 "
Mix.	

Dyeing Chamois Leather.

Chamois leather may be dyed to any colour required, and produces very beautiful results.

Perhaps the best results have been obtained by the use of the direct cotton colours, as these will work satisfactorily in the presence of soap, which is essential to retain the characteristic "feel" of chamois leather. Some alizarines have been used with satisfactory results. The dyeing is accomplished in a drum or paddle as for other leather, and the skins are dyed quite through.

Another method is to mix the colour into a thick consistency with the aid of water and clay. For delicate colours china clay may be used, while for dark ones ordinary clay will do. This thick mixture is brushed into the surface of each skin, one at a time, and allowed to dry. Afterwards the dry clay is beaten out of the skins. Of course, the colour is not fast, and the more vigorous the beating the paler the shade of colour. But the leather is coloured on one side only, which is necessary for some purposes.

For gloving work of the best description, the yolk of eggs is added to oil and a little soap, to produce a dressing which will give that excessive suppleness and fullness to the finest glove leather.

Deodorising Petroleum, Resin, Spirit, etc.

2828 N. M. S., Ahmedabad—Wishes to have formulas for deodorising petroleum, resin, spirit, oils, etc.

Glacial acetic acid	1 part.
Water	1 part.
Mix.	

Use equal parts of above with chloride of lime. One pound of each to the Cwt. (reckoning 8 lbs. oil to the gallon).

Put in the lime first. To remove any further smell, use washing soda (dissolved in water), 1 lb. to the cwt.

Deodorising Coconut Oil.

There are two well known methods for the deodorisation of coconut oil: (1) Wash out the odoriferous bodies with alcohol. This removes the fatty acids, and also such substances as phytostero. Some employ a joint process of washing with alcohol followed by treatment with charcoal. (2) Pass high pressure steam at 6-8 atmosphere into the fluid oil for two or three hours; the non-volatile fatty acids left are to be removed by adding 0.25 per cent. of calcined magnesia, and the magnesium soap formed is then skimmed off the surface.

White Paint.

2374 A. N. M., Benares City—Wants recipes of white paint, white enamel paint, enamel paints, etc.

Mix 14 lbs. of white lead, 4 ozs. of driers, 4 pints each of raw and boiled

linseed oil, and $\frac{1}{2}$ pint of turpentine. If the work is to be finished white, care must be taken to use pure white lead, and raw linseed oil. The brushes and tins must be quite clean; after mixing the paint must be kept covered to prevent discoloration.

White Enamel Paint.

I.

Albertol Extra pale	100 parts.
Linseed Oil palest	90 "
Thickened wood oil	20 "
Cobalt	.075 "
Thinner	150 "

Cook the albertol with the linseed oil at 240°—260°C until a small test of the batch, thinned out with double the normal proportion of diluents, and cooled down under the tap, remains quite free from cloudiness. Then add the thickened wood oil and again raise the temperature to 240°C; after again carrying out the dilution test described above add the cobalt and thinner.

II.

Zinc white	80 parts.
Titanium White	20 "
Varnish	120 "

Grind together thoroughly and then to brushing consistency.

Enamel Paints.

A desire for glass coatings of great brilliancy and light-reflecting value, for the interior wood work of dwellings has led to the manufacture of special paints of this sort which are popularly known as enamels. These were at first produced by dissolving white damar gum in turpentine and using this liquid as the vehicle in which to grind the pigment

base, which was generally composed of French process zinc oxide used in sufficient quantity to give an enamel of good body. When applied to a surface, such enamels would dry rapidly to a high gloss. Higher grade enamels were made of French process zinc oxide ground in short oil varnishes of the copal type. More recently, however, lithophone has been used in place of zinc oxide for the production of certain types of enamel. Bodied oils are also finding a wide application as a vehicle for such products. Linseed oil, blown and bodied to a very heavy consistency, forms an excellent enamel vehicle especially when mixed with a light hard resin varnish. Enamel paints produced through the use of such oil are more durable for exterior purposes than those produced from straight spirit or gum varnishes. In the manufacture of some enamels the pigment base is often milled in a very small amount of bleached linseed oil, in order to condense it as much as possible the paste being reduced with boiled oil and run through roller mills, subsequently to be thinned with a light turpentine oleo-resinous varnish. Zinc and lithophone enamels have almost entirely replaced the use of corroded white lead for interior painting work. As a ground coat for these enamels there is generally applied a paint made of lithophone ground in a vehicle which will dry very flat. The application of the enamel over the flat coating produces a very brilliant and durable finish.

Boiled Linseed Oil.

The usual method of producing boiled linseed oil is by the addition to the

raw oil of from 4 to 8 per cent of liquid drier, that is liquid solution of metallic salt. In practice, the boiling is performed by first thoroughly heating and agitating the raw oil to expel all moisture and then adding the previously heated drier very slowly, agitating sufficiently to thoroughly mix the drier through the oil. One mode of agitations for expelling moisture is, after heating the raw oil in the tank to 250 degrees, to pump the hot oil from the bottom out and into the top. The heating is usually done by hot steam coils within the boiling tank, and the best location for these coils is around the sides of the tank and not closer than ten inches to the bottom. The oil is maintained at a high heat for some time after the addition and thorough mixture of the drier. The longer the temperature is maintained, the darker the oil becomes. The scum which forms on the surface, the residue left in the tank, and the scrapings from the filter cloths are disposed of separately.

Usually 10 or 11 gallons of raw linseed oil are taken in a copper or iron vessel with an enlarged mouth to prevent the oil from frothing. The oil is heated and as soon as boiling commences the driers added in small quantities at a time with constant stirring by means of an iron rod. The proportion and the nature of the driers used vary much. For the quantity of the oil in the vessel, either of the following mixtures may be used.

2½ lbs. of red lead and 2¼ lbs. litharge; or 2¼ lbs. of litharge and 2¼ lbs. sugar of lead.

The driers are previously ground as finely as possible and the oil well stirred

after each addition. As soon as the driers are all in and the frothing has ceased the pot is filled with oil just up to the neck, and the fire regulated so that the temperature does not rise above 220° deg. C., by means of a thermometer with metallic frame work. The operation is generally completed in three hours, during which time the driers are frequently stirred up from the bottom. The pot is then withdrawn from the fire, and the oil is set aside to clarify; or if it be desired to start boiling a fresh batch it is run into a galvanised wrought iron tank.

Destroying White Ants.

3078 J. N. P., Maymyo—Wants a recipe for destroying white ants from garden.

A little crude arsenic finely powdered diluted in water in the proportion of about one teaspoonful in a quart of water for 4 plants and applied to the roots will drive away white ants. Use this in bad cases for a fortnight. If you can, however, get neem oil cake add this powdered allowing $\frac{1}{2}$ lb. to each plant, water the plants with neem water every day, and the ants will leave the plants when an occasional application of oil cake and neem water will keep the white ants away. When putting in new plants always mix the neem oil cake and a teaspoonful of powdered crude arsenic in the soil and white ants will not come to the plants. The arsenic is only necessary when the ants are found in great numbers and are very persistent; but usually the neem water and oil cake are enough.

Artificial Leather.

3631 R. M. S., Dohad—Desires to learn a process of making artificial leather from leather waste.

Leather cuttings are made into artificial leather, which can be used for the soles and heels of boots. The manufacture is very simple. The leather waste is made, with the addition of a binding medium, into rectangular plates, which are put one on the other, pressed in a hydraulic press, dried, and rolled.

If the leather waste is impure, it is first freed from all foreign constituents, after which it is converted into a uniform fibrous material. When this finely divided leather is mixed with ammonia solution, a gelatinous mass is formed, which when pressed into moulds or rolled into sheets and dried, gives a very hard and stiff material of considerable cohesion, but without elasticity, and is soluble in water. In order to make it elastic and resist the action of water, it is mixed with para rubber. The rubber is squeezed and wasted in the washing machine, which consists of two grooved sheet rollers, over which is led a stream of water, which has the double effect of washing the rubber clean and preventing it from being burnt by the great friction. After washing, the rubber is dried, cut up, and dissolved by means of spirit of turpentine, benzine, carbon disulphide or other suitable solvent. The rubber so prepared is then mixed with the ammonia solution, and the mixture well stirred. The proportions of the mixture depend on the quality of the product to be made. For example, for soles, 25 parts of solid rubber, 67 parts of ammonia, and 67 parts of leather; for heels, 25 parts of rubber,

80 parts of ammonia, and 80 parts of leather; for welts, 25 parts of rubber, 75 parts of ammonia, and 90 parts of leather. After kneading until the mass is quite homogeneous, it is dried. During the drying it is subjected to progressive pressings, the intensity of which varies according to the destined application of the product. After pressing, the substance is either painted or lacquered, or treated in some other way to give it a similar appearance to natural leather.

Brazing Copper Articles.

3324 J. N. C., Ootacamund—Wants to be enlightened with the process of brazing.

For brazing, where powdered or grain spelter (a very fusible brass) is used, the borax is mixed as a powder with a spelter, usually with a little water, but sometimes the work to be brayed is made hot and dipped into the dry powder mixture, which partially fuses and adheres. In either case, care is requisite not to burn or oxidise the grains of the spelter with the blow pipe flame, or it will not run or adhere to the surface to be brazed; and for such small work as can be done with the mouth blow pipe it is better to discard spelter entirely, and use either common silver solder, which is an alloy of one silver and two of tinned brass pins, or what is still better an alloy of 13 parts of copper and 11 parts of fine silver.

Solder for Aluminium Articles.

Melt together 5 parts tin, 4 parts lead, and add 6 parts melted aluminium. Then add 1 part zinc. Mix thoroughly,

mould and cool. For light work, 6 parts tin, 5 parts lead, 4 parts aluminium, 1 part zinc. No flux needed. The second melts at lower temperature. Employ with the usual brazing flame.

Gilding Books.

2722 M. I., Lahore—Wishes to learn the process of gilding books.

To gild books with letters and figures gum mastic, in fine powder, is dusted over the surface to be gilded; an iron or brass tool bearing the design upon its face is then heated to a proper temperature, and gently pressed upon a piece of leaf gold, which slightly adheres to it; the two are then transferred to the cover and the tool is gently pressed on it, by which means the mastic softens and retains the gold. The loose gold and powdered mastic are then dusted off with a brush. Gold leaf will adhere to leather without the use of mastic, but not so firmly as when it is employed. The edges of the leaves of books and paper can be gilded in the following manner. The edges are cut perfectly smooth, and then washed over with a solution of isinglass in weak spirit, or with a varnish made of Armenian bole 4 parts and powdered sugar candy 1 part, mixed up to a proper consistence with strained white of eggs. The coating is allowed to dry, and is then smoothed with a wet rag, after which the gold leaf is applied and polished with the burnisher.

Silvering book edges may be done in the above manner by taking silver leaf instead of gold leaf.

Preparation of Iodoform.

2775 C. L. P., Mombasa—Wants to learn the process of preparing iodoform.

Bicarbonate of potash	
(pure)	10 parts.
Alcohol (90%)	25 "
Distilled water	120 "
Iodine (crystals)	10 "

Put the iodine in a comparatively long-necked flask, add the bicarbonate of potash, distilled water and alcohol. Now fit a cork through which passes a long glass tube; heat on a water bath, not too quickly to about 176° F (8° C); and add after decoloration of the liquid, 25 parts of iodine; then add 2 and afterwards 1 part of iodine, waiting with each addition till the liquid has lost its brown colour. If iodine should happen to be a little in excess, add cautiously some solution of potash until decolorised, which shows completion of the process. Now pour the liquid into a porcelain dish, cover and let stand for 24 hours, throw on a filter, and wash the iodoform with cold distilled water. The iodoform will then separate out. It is dried between folds of blotting paper and enclosed in well-stoppered bottles. Care should be taken during packing otherwise the iodine may be spoilt.

Peppermint Lozenges.

2776 E. A. K., Mombasa—Wants a process of preparing peppermint lozenges.

Take 28 lbs. of icing-sugar, and a heap of it on the slab with a big hole in the centre of the heap, then pour in 4 pints of thick acacia mucilage, and on that 1 oz. of peppermint oil, working the

liquids well together. When sufficiently mixed, stir in the sugar from all round the sides and make the whole into a stiff paste with as much of the sugar as can be used. If it is too stiff, add more mucilage; if too sticky, more sugar. The paste is now ready to be rolled out. Take about 2 lbs. from the bulk and work it with the hands into a compact square piece, keeping it from sticking to the slab by means of powdered starch. Next roll out a portion of the mass upon the slab with the sides adjusted to a bright equal to the thickness of the lozenges desired. Then cut out the lozenges with a punch. While the mass is being rolled, sprinkle it with icing-sugar, to prevent it being stuck. Transfer the lozenges to a tray, expose to dry air for 12 to 24 hours, and finally place in the drying cup-board until hard.

Bordeaux Mixture.

3365 S. M., Nalladai—Wants a recipe of Bordeaux mixture.

Copper sulphate	32 tolas.
Quick lime	32 tolas.
Water	1 maund.

Dissolve the copper sulphate in half the water in an earthen or wooden vat by suspending it in a gunny sackening just immersed in the water. Then slake the stone lime slowly in another vessel by adding a quantity of water little by little until the bubbling ceases, after which add the rest of the water. Lastly mix the two solutions by pouring one into the other.

READER'S BUSINESS PROBLEMS

[Reader's business problems will be discussed in these pages. We invite the reader to write us his difficulties. As the department is in charge of an experienced businessman who is specially adept in dealing with such problems and to whom experiences of a large number of successful business men are available, his replies will lead the enquirer to a successful career. These replies will be published in the paper only and cannot be communicated by post.]

Difference between Retail and Mail Order Business.

3047 L. N. O., Bombay—Writes, what is the difference between Retail and Mail Order business.

The retailer depends upon being topical and novel in his display. His shop must be fresh and contain the latest goods.

The mail order business, on the other hand, gains its chief success by constant adherence to one unvarying quality, if possible at one unvarying price, the goods being marked with an easily recognised description, so that the buyer in January of this year may be able to rely upon getting the same article he got in March of last year.

In advertising, the object of retail publicity is to draw buyers to the shop; in mail order business, to keep their attention on the article.

The retailer need not make a profit on the article he advertises. The mail order trader must do so. One can offer goods that will not be repeated—that may even be cleared out in an hour. The other courts disaster if he cannot keep up a constant supply of his advertised brand.

Publishers' Agreement.

3588 P. K. M., Bombay—I have written a book which I wish to be published by one of the reputed publishers

of books here. Will you please advise me as to how I shall make agreement with the publisher?

There are four kinds of agreement in vogue between authors and publishers in regard to books viz., (1) Commissions; (2) Copyright; (3) Profit sharing and (4) Royalty. In commission agreement the author bears all the cost of producing the book and pays the publishers a commission on sales. But this method is not recommended to a new author. Publishers are businessmen and are always on the lookout for profit making and they won't push books of new authors unless they get handsome commission. If you can once make your name as good writer you can arrange with publishers to sell your books on commission.

In copyright agreement the publisher gives the author a lump sum for all rights in his book. This is rarely done now by first class publishers in the case of ordinary books, though the practice continues where books for boys and girls are concerned. It should be remembered that copyright carries with it all rights, and the book may turn out to be a huge popular success, even to the point of being dramatised or produced as film play. Copyright power, ill-used is a deadly weapon as more than our unfortunate author has cause to deplore. Outright selling of copyright demands caution and competent advice. If a book

is in any way datable, a clause should be inserted in the Agreement which will make republication dependent upon revision by the author.

Profit sharing agreement should only be entered into with a firm of known repute, because however much you may study the accounts submitted to you from time to time, you have no possible means of checking them and you will hardly understand many of the items. You must have complete confidence in the absolute honesty of your partner, the publisher, for you are entirely in his hands. Given this confidence the arrangement is good, for where the book runs to a very large circulation the author will get more out of it than on any but a very big royalty.

Royal arrangement is far the best for a new man, for he knows where he is, and unless the publisher is a rogue indeed, it will be difficult to cheat. It would in fact, mean falsifying books and putting himself at the mercy of his clerks, unless he keeps all his figures in his own hands. In royalties paid according to contract tremendous variations occur. As a first author you cannot expect the royalties of an established writer. In most cases royalty on a first book begins at 10 p.c. of the published price. Fifteen per cent, however in most cases is the top royalty. As regards advances or sums paid on account of royalty to an author there is no set rule.

How to Get New Customers.

3566 L. D. H. L., Lahore—What is the best of way increasing customers without incurring any heavy expenses.

The one sure way to get new customers is to treat your present customers so well that they will speak well of you. A jeweller made a study to find out why new customers came to him and he found that 30 p.c. came because of recommendations from his present customers. A bank made a study to find out how it got new depositors, and it found that 25 per cent were brought in by other depositors. When a firm is friendly as well as efficient—when it takes a per-

sonal interest in its customers—they respond by recommending it to others.

What a firm says about itself—that is advertising and it is costly. But when its customers speak well of it—that is good will. It is more effective and it costs nothing.

How to Fix Prices.

2789 C. L. L. N., Madras—I am a grocer. I experience some difficulty in fixing the price of the things sold in my shop. Will you please throw some light on the subject by letting me know the principle on which goods are to be priced?

This is a rather puzzling question. The tradesman or shopkeeper naturally wishes to sell his goods at the highest available figure but this is limited by the price at which it is sold by his rivals. Sometimes owing to his higher overhead charges he cannot afford to sell his wares as cheaply as his next door rival, whose establishment charges may not be so high. Occasionally, some erratic shopkeeper, with a view to securing quicker turnovers or injuring his rivals, starts underselling the goods stocked by him to the detriment of others concerned in that particular business. All these factors have to be taken into consideration in fixing the prices of your goods. You should always bear in mind that the right price is the one that will bring you the most net profit in the shortest time without the loss of customers. You can afford thus to reduce your prices, by doing so you can increase your sale so as to be able to sell goods twice as frequently as you used before. But low prices do not inevitably increase sales. The Stock Exchange rates will bear this out. There you will always meet with fewer buyers when the price is low and more buyers when the price is high. There again the purchasers very often suspect the quality of things when prices are lowered, and it has been found that in such cases by raising prices sales actually increases.

In the circumstances the price for your commodities must be the figure which your customer is willing to pay but it should not be a great deal less than that.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of Industry are invited. Enquiries or replies from our experts will be published free of charge. Questions are replied by post on receipt of As. 4 stamps of small value only for each question. In order to facilitate the work of Editor's Department and to help prompt action the readers are requested to send enquiries in separate letters.]

3483 J. E. P., Tuticorin—Before sending photos you should arrange with the proprietors regarding cost. You may also send your photos for photo competition to Times of India Illustrated Weekly, Bombay.

3484 S. R. I., Annigeri—(1) Two articles on sugar industry will be found in October and November 1934 issues of Industry. If you go through the articles you will get all the information required. (2) For rice milling small machine you may write to Lemon Bros., Barnagore, near, Calcutta. (3) Sugar making machines may be had of Bhowani Engineering & Trading Co. Ltd., 56, Gouribari Lane, Calcutta. Machine suppliers will give you estimate, outturn, etc. Now a days vegetable cultivation seems to be profitable.

3486 D. B. M., Bhavnagar—An article on envelope manufacture will be found in August 1934 issue of Industry. If you go through the article you will get all the information required. Envelope making machines may be had of Oriental Machinery Supplying Agency Ltd, 20, Lall Bazar Street, Calcutta. Envelope making paper is manufactured by all paper mills in India. Paper for envelope making may be had of C. M. Sur & Co, 105, Radha Bazar Street and Nilmoney Halder & Co., 106, Radha Bazar Street; both of Calcutta

3489 A. S. M. R., Kollengode—Vide No. 3480 above.

3491 R. K. M., Sangor—Process of preparing hydrogen to be filled in a balloon will appear in an early issue of Industry.

3495 K. S. W., Lahore—For novelties write to Birubaum & Rehbock, Furth, Bay, Germany;

Brandtjun Carl, Gossnitz, Altenburg, Germany; Kaneda Yu Shoten, 609, Shinkawa 2-Chome, Naniwakun, Osaka, Japan and Nakayoshi Shoten, Minami Kynhojinnachi 1-Chome, Higashi-ku, Osaka, Japan.

3496 J. M. B., Sialkot—A recipe of vanishing ink appeared in the last issue.

3497 Y. G. S., Lucknow—Attempts are being made at Dhanbad for extracting petrol from coal. Process is not available.

3498 S. N. M., Karachi—(1) Yes you may send Indian Sweets by preserving them in concentrated syrup and packing in air-tight cans. (2) China grass is a natural product Other formulas you require will appear in an early issue of Industry.

3502 A. V. R., Gadag—(1) An article on envelope making will be found in August 1934 issue of Industry. (2) Other formulas you require will appear in an early issue of Industry.

3503 M. C., Arni—Process of manufacturing washing soda or soda ash will be found in November 1932 issue of Industry.

3507 H. G. C., Bombay—Following is a list of porcelain ware manufacturers: Sorab Dalal Potteries, West View, Khanpur Road, Ahmedabad; Government Porcelain Factory, Malleswaram, Bangalore; Finix Pottery Works Co., Gandevi, Navsari, Baroda; Bengal Potteries Ltd, 45, Tangra Road, Calcutta; Chunar Pottery Works, Chunar; Delhi Pottery Works, Raisina, Delhi and Gwalior Potteries Ltd., Lashkar, Gwalior.

3508 B. B. O., Patna—You may work out any formula. If the product manufactured according to the formula be a good one you can

Machinery for the Manufacture of

Chemicals, Powder, Hair Oils, Creams, Perfumes, Pills, Tablets, Drugs, Medicines, Artificial Ghee, etc. Also:—

Chemical Plant, Oil Mills, Filter Presses, Sugar Mills & Centrifugals, Tin Box Making Machinery, Sterilisers, Laboratory Apparatus, Biscuit and Bread Making Machinery, Laundry Machinery, Tube-filling Machinery, Winnowing Machinery, Threshing Machinery, Fruit Preserving Machinery, Water Softening Plant, Slate and Stone Working Machinery and Pumps for all purposes.

W. J. ALCOCK & CO., 7, Hastings Street, Calcutta. Saroup & Bansilal, 57, The Mall, Lahore. Agent for Bareilly District KODESIA ENGINEERING CO., Naini Tal Road, Bareilly.

put it in the market and sell it. This does not involve any unfair means. You may choose any formula from either Industry or our publication.

3509 M. M. L. Unao—You may write to Bepin Behari Dass, 69, Radha Bazar Street, Calcutta for stereoscopic equipment.

3512 R. J. S., Pathapatnam—You may use amla hair oil which will turn gray hair black. A recipe of hair dyeing oil will be found in July 1933 issue of Industry.

3514 C. C. Changanacherry—Owing to restriction of rubber import by various countries demand for raw rubber has fallen considerably. But local demand is growing as some factories have already been started in several parts of India for manufacturing rubber goods specially rubber shoes. According to rubber restriction agreement the quota of India's export during the four years from January 1935 to 31st. December 1938 will be 8250 tons, 9000 tons, 9000 tons and 9520 tons respectively. Process of manufacturing sugar will be found in July 1932 issue of Industry and Sugar in India by H. H. Ghosh published from this Office

3517 M. L. M., Margao—Manufacturing process of crackers is not available.

3521 A. C. S., Imphal—For preserving rice you may use slaked lime.

3522 B. S., Rawalpindi—You may consult Uberssee Post, 1, Salomonstrasse, Leipzig, Germany; Czechoslovak Trade Journal, Prague P Box 476, Czechoslovakia; L' Exportateur Francais, Paris, France and Commercial Osaka Published by The Osaka Commercial Museum, Osaka, Japan.

3523 V. T. W., Madras—Tallow may be had of Calcutta Tallow Factory, 19, Tippetta Bazar Street, Calcutta; Holt & Co., 11, Elphinstone Circle, Fort, Bombay; and Varadasheh Lard Factory, Triplicane, Madras.

3524 M. T. B., Peshawar—You may start an aerated water factory. For machine and other accessories you may write to Little & Co., 2, Grants Lane, Calcutta.

3526 J. L. Z., Benares City—For gum anime write to Banshidhar Dutt & Sons, 126, Khengrapatty, Barabazar, Calcutta; B. K. Paul & Co., Ltd., 1 & 3, Bonfields Lane, Calcutta and Joy Gopal Dutt & Sons, 40, Clive Street, Calcutta.

3527 S. C. D., Faridpur—There is no such dairy farm Process of manufacturing syrup

of basak etc. will appear in an early issue of Industry.

3528 K. R. V., Tanuku Taluq—Butter preserved according to the process given to you will remain good at least for 6 months. (2) Butter for edible purposes is prepared from fresh milk and preserved for sale. (3) Wants to be put in touch with ghee and butter merchants in Rangoon. (4) A list of hotels throughout India will be found in Industry Year Book & Directory published from this Office. (5) For the books enquire of Thacker Spink & Co. (India) Ltd., 3, Esplanade East, Calcutta

3530 K. A. B., Indore—You may try to be an apprentice in a laundry firm. Laundry machines may be had of American Laundry Machinery Co., Cincinnati, Ohio, U.S.A. and Troy Laundry Machines Co. Ltd., Chicago, Illinois, U.S.A.

3532 C. I., Lucknow—Process of manufacturing turpentine oil will appear in an early issue of Industry.

3533 B. R. D., Surat—Watches may be supplied by Uyemura Watch Co. Ltd, Bakuromachi, 2-Chome, Higashi-ku Osaka, Japan and Yamabatsu, Shokwai, 28, Minami Honmachi 2-Chome, Higashi-ku, Osaka, Japan and S. Tomio & Co., 1, Andojibashidori 4-Chome, Minami-ku, Osaka, Japan.

3537 C. H. C., Thamang—We cannot supply formula of patent preparation. Hence it is very difficult for us to give an estimate and other particulars regarding the preparation.

3538 B. S. R., Ghazipur—(1) Bronze powder may be had of Joy Gopal Dutt & Bros., 40, Clive Street, Calcutta. (2) Mohua oil may be had of Sree Govinda Oil Mill, Bansmandi, Cawnpore. (3) Alkanet root, orris root etc may be had of Banshidhar Dutt & Sons, 126, Khengrapatty, Barrabazar, Calcutta. (4) Precipitated chalk and other ingredients may be had of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta. (5) Process of making washing soap will be found in December 1934 issue of Industry. (6) Brushes may be had of Agra Brush Factory, Jani Mandi, Bailanganj, Agra. (7) Packing paper may be had of C. M. Sur & Co, 105, Radha Bazar Street, Calcutta. (8) Formulas you require will appear in an early issue of Industry.

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GANN BROTHERS, TOPALL WORKS, LUCKNOW.

THE ONLY SUPPLIERS IN INDIA OF

COMPOSITION CORKS FOR FOUNTAIN PEN INK POTS, BOOT CREAM BOTTLES, MEDICINAL AND FOR HAIR OIL PHIALS. COMPOSITION POTS FOR OINTMENTS, POWDERS, POMADES, ROUGE, SINDUR, SNUFF, ETC.

Branches: 153/1, RADHABAZAR STREET, CALCUTTA. 3, CHUNAM LANE, BOMBAY; 7.



3542 P. S. B., Rawalpindi—(1) Quantity of fullers earth required should be ascertained by actual experiment. (2) Yarn and elastic thread may be had of Karim Bux & Elahi Bux Bros., 58-4, Canning Street, Calcutta. (3) You may use spirit chloroform instead of rectified spirit.

3543 N. S., Budaun—(1) For tin phials you may write to Metal Decorating & Shaping Co. Ltd., 112, Narkeldanga Main Road, Calcutta. (2) Process of making morabba of salepmisri is not available. (3) Yes, lac making is a profitable industry no doubt.

3546 R. N. R., Kumbakonam—You will find a list of books on rubber at the end of the article under the Caption of Bibliography. For machineries write to Duncan Mackenzie's Sons Co., Trenton, New Jersey, U.S.A. and Adamson Machine Co., Akron, Ohio, U. S. A.

3548 N. K. A., Sind—You may refer your query to Consul-General for Japan, 26-27, Dalhousie Square, Calcutta.

3550 C. L. W., Ernakulam—Refer to No. 3548 above.

3551 S. I. A., Bhadasy—Two articles on sugar industry appeared in October and November 1934 issues of Industry. If you go through those articles you will get all the information required. Sugar making machines may be had of Bhowani Engineering & Trading Co. Ltd., 56, Gouribari Lane, Calcutta and Martin & Co., 12, Mission Row, Calcutta.

3552 K. C. B., Karachi—Process of manufacturing corn flour will appear in an early issue of Industry.

3554 H. R. P., Sargodha—(1) Celluloid sheets, etc. may be had of Mitsui Bussan Kaisha & Co. Ltd., 100, Clive Street, Calcutta. (2) The firm will supply you with their quotation. (3) Celluloid goods are manufactured by Calcutta Celluloid Works Ltd., 45/2, Wellington Street, Calcutta; Indian Celluloid Works, 4/5, Dalhousie Square, Stephen House, Calcutta and Jessore Comb & Celluloid Works, Basanta Kutir, Jessore. (4) For books on celluloid industry write to W. & G. Foyle Ltd., 119-125, Charing

Cross Road, London W.C.2. (5) It will be advisable for you to appoint an expert who will advise you regarding bakelite, ebonite, galalith etc.

3556 S. C. K. Kadi—(1) You may consult Guide to Life Assurance by J. C. Mitra published by The Insurance and Finance Review, 14, Clive Street, Calcutta. (2) An article on envelope making will be found in August 1934 issue of Industry. In manufacturing thread ball and hosiery goods you need not take any special training. Machine dealers will supply you with the working process of machine.

3558 S. P., Tondamannar—(1) Aluminium wares may be had of Jeewanlal (1929) Ltd., 11, Clive Street and Aluminium Manufacturing Co., 9, Clive Street; both of Calcutta. (2) Nut crackers may be had of The Chhatbar Trading Co., 8, Chhatbar Mansions, Jamnagar, Kathiawar. (3) Clay models may be had of Aswini Kumar Paul, Krishnagar, Nadia; Rakhaldas Paul & Sons, Ghurni, Krishnagar Nadia and S. C. & K. C. Paul, Ghurni, Krishnagar, Nadia. (4) For soldering aluminium you may use the following alloy: Melt 20 parts of aluminium in a crucible. Then add gradually 80 parts of zinc and when this is melted some fat. Stir the mass with an iron rod and pour into moulds. The flux consists of a mixture 3 parts of copaiba balsam, 1 of Venetian Turpentine and a few drops of lemon juice. The soldering iron is dipped into this.

3559 K. V., Chandragiri—(1) Bone charcoal obtained by burning bone with fire wood is used in refining oil and sugar. (2) You need not burn bone for using as manure, simply crush it and use as manure.

3561 H., Bombay—(1) Collapsible tubes are not manufactured in India at present. (2) For collapsible tubes write to Shah & Co., 55, Ezra Street, Calcutta. (3) Tooth brushes may be had of H. Yoshida & Co., 28, Nichome Neshuomachi Tennojiku, Osaka, Japan. (4) Japanese address of collapsible tubes dealer is not available. You may write to On Instituto



UNION SPECIAL

SEWING MACHINE FOR HOSIERY, LEATHER,
CANVAS AND JUTE, ETC.

High Speed Latest Models for Overlocking and Hemming.
Double and single chain stitch; ornamental necking, 4
needle button plate joining, etc., etc.

Sole Representatives.

DON, WATSON & CO.,
4, Lyons Range, CALCUTTA.

Union Special High Speed Overlock
Machine for Hosiery Trade.

Nazianale, per Esportazionale, via Torino 107, Rome, Italy.

3563 C. L. Pihlhiit—(1) For the book you require write to Thacker Spink & Co (India) Ltd., 3, Esplanade East, Calcutta and N. Newman & Co Ltd, 3 & 4, Old Court House Street, Calcutta. (2) Paints and varnishes may be had of B. K. Datta & Co., 35, Clive Street, Calcutta; Barry & Co., 2, Fairlie Place, Calcutta, Chanch Charan Nayak, 124/1, Bowbazar Street, Calcutta, Jenson & Nicholson (India) Ltd, 2, Fairlie Place, Calcutta; P. K. Dutta & Co., 94 Harrison Road, Calcutta and Sarkar & Co., 96, Harrison Road, Calcutta. (3) All the ingredients you require may be had of the above firms. (4) No such dictionary is available. (5) Carrom board may be had of Mitra & Co., 136/1, Cornwallis Street, Calcutta; Carr. Mohalanobis & Co., 3, Chowringhee Road, Calcutta and Mohuntosh Bros, 15, College Square, Calcutta. (6) Tiles may be had of Bahadur Tile Works Jeppo, Mangalore, S. Kanara, Commonwealth Tile Factory, Olavakot, Malabar; A. P. Ghosh, 199/1/2, Upper Chitpur Road, Calcutta; Paul & Co., 10, Kumartuli Street, Calcutta and Building Material Supply Agency, 199/2, Upper Chitpur Road, Calcutta. (7) Design, sketches, scenery books may be had of W. Newman & Co. Ltd., Calcutta.

3565 J. B. Dhulia—(1) Thank you for your suggestion. Our readers generally bind the whole volume with the alphabetical index so that whenever they require any information they consult the index and find out easily. Regarding welding you may read some books dealing with the subject. For such books you may write to W. Newman & Co. Ltd 3 & 4, Old Court House Street, Calcutta and D. B. Taraporevala Sons & Co., Ltd., Kitab Mahal, Hornby Road, Fort, Bombay. An article on oxy-acetylene welding appeared in January 1934 issue of Industry. If you go through the article you will get much information on the subject. Oxy-acetylene welding plant may be had of Gas Accumulator Co. (India) Ltd., 12, Mission Row, Calcutta.

ANALYTICAL & CONSULTING CHEMIST.

I undertake all kinds of commercial technical chemical analysis; solve difficulties, undertake problems and give advice in respect of chemical handicrafts and small industries.

Fees very moderate. For particulars write with 2 As. Stamps to:—

C. S. MARATHE, B.Sc.,
P. O. Vile Parle, Bombay.

3568 P. A. S., Madras—In these days of world-wide economic depression it is very difficult to push on any new thing specially luxury goods such as brilliantine. But if you can produce brilliantine as good as foreign one and can advertise widely you may sell brilliantine. A good recipe of brilliantine follows: Alcohol (9) per cent. 4 oz.; castor oil 2 oz.; oil of neroli 20 mins; oil of rose geranium 5 min. oil of verbena 5 mins; oil of lemon 50 mins. Mix. Raw materials may be had of Paradise Perfumery House, 75, Colootola Street, Calcutta and B. K. Paul & Co. Ltd.: 1 & 3, Bonfields Lane, Calcutta. Bottles and labels may be had of Shah & Co., 55, Ezra Street and Sikri & Co., 55, Canning Street; both of Calcutta.

3569 P. B., Burhanpur—Cream of tar may be had of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta.

3570 G. N. P. Ganjam—(1) Reply to your previous queries appeared in September 1934 issue of Industry under No. 1680 in Brief Queries and Replies Column. (2) Superfine Blue G. O., aniline black, etc. may be had of Fuzle Hussein & Bros. 44, Armenian Street, Calcutta. (3) Dextrine, ferrous sulphate, potassium ferrocyanide, etc. may be had of B. K. Paul & Co., Ltd., 1 & 3 Bonfields Lane, Calcutta. (4) Gall nuts etc. may be had of Banshidhar Dutt & Sons, 126, Khengrapatty, Barrabazar, Calcutta. (5) Oriya equivalents of gum arabic and gallnuts are not known. (6) For preparing borax soap first prepare the coconut oil soap required for this purpose according to the following process. Put 100 lbs of coconut oil and 100 lbs. of caustic soda lye of 27° Be into a soap kettle; boil and mix thoroughly for 2 to 2½ hours, until the paste gradually thickens; then diminish until the cooling paste assume a white, half solid mass; then transfer quickly to the frames. Add 100 parts of borax to 900 parts of coconut oil soap and mix until a homogeneous mass is obtained; cut into pieces of required size and press and dry the pieces. (7) For preparing hair oil you should refine the castor oil to be used. (8) Biri tobacco may be had of Mulji Sikha & Co., 51, Ezra Street and Ram Chandra Bajranglal, 173, Harrison Road; both of Calcutta. (9) Phials and bottles may be had of Sikri Bottle Stores 9, Ezra Street, Calcutta.

3574 K. P., New Delhi—Prepared suet is the purified internal fat of the abdomen of the sheep. This may be had of B. K. Paul & Co., Ltd., 1 & 3, Bonfields Lane Calcutta. Alkanet root is known as rangpat.

3575 M. T. A. Rangoon—For books on litho printing you may write to Thacker Spink & Co., (India) Ltd, 3, Esplanade East, Calcutta. You should cure the tobacco first then preserve it. Various methods of curing tobacco will be

found in Indian Tobacco and Its Preparations published from this Office.

3576 P. D., Darbhanga—(1) You may send your product to the Superintendent, The Government Test House, Alipore, Calcutta for proper analysis and certificate. (2) Application for the registration of patents are to be made to the Registrar of Patents, 1, Council House Street, Calcutta.

3577 M. C. C., Karachi—It is not possible for us to supply a list of journals and magazines issued from the schools and colleges of India. You better write to Director of Public Instruction of every province.

3578 A. N. G., Benares—Your query being in the nature of an advertisement should not be published in these columns. You better put an advertisement in Classified Bargain pages of Industry.

3580 M. P. K., Karkat—For cotton printing blocks, you may write to Bharat Chitralaya, 355, Upper Chitpore Road, Calcutta.

3582 M. M. A., Hyderabad—You may write to Government School of Art, 28, Chowringhee, Calcutta; Indian Art School, 240A, Bowbazar Street, Calcutta and School of Arts, Trivandrum, Travancore for learning photography.

3583 N. V. K., Calcutta—(1) For birch tar you may enquire of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta. This should be mixed with the soap after complete saponification has taken place. (2) Sal hycol may be had of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta.

3584 H. C., Gujrat—You may write direct to U. S. Dept. of Agriculture, Washington, U. S. A. for a copy of Industrial & Engineering Chemistry.

3585 S. L., Delhi—Brushes may be had of Satya Narayan & Co., Bailanganj, Agra; Indian Brush Factory, Bansmandi, Cawnpore and Brushwares Ltd., 123/1, Halsey Road, Cawnpore.

3586 A. M. S. A., Ahmedabad—You may send reminders to the parties.

3589 K. L. N., Dera Ghazi Khan—Vernacular equivalents of cloves are lavang, launga, karanaphul and mekhaka. Vernacular equivalent of mustard is rai. Vernacular equivalents of other ingredients are not available.

3593 P. S. D., Fulaguri—You better consult a book on cooking.

3596 N. L., Wazirabad—(1) A good recipe of bindi will be found in May 1934 issue of Industry. (2) Process of making grape vinegar will be found in November 1933 issue of Industry. (3) Process of making vinegar with acetic acid will be found in July 1933 issue of Industry.

3597 K. B., Srinagar—Before starting a glass factory you should read some literature on the subject such as Glass Manufacture by Walter Rosenham published by Constable and Company Ltd., 10, Orange Street, Leicester Square, London W. C. For machineries you may write to W. J. Alcock & Co., 7, Hastings Street, Calcutta.

3598 D. D. B., Birganj—For the machineries you require write to W. J. Alcock & Co., 7, Hastings Street, Calcutta.

3599 G. S. S., Aligarh—Cyclostyle printing machines may be had of Roneo Ltd., 9, Clive Street, Calcutta. Particulars may be had from the above company on writing.

3602 A. C. P., Gauhati—(1) From orange peel you can manufacture oil of orange or essence of orange. Following is the process of making orange oil: Take one seer of fresh peels of orange and mince them. Take also one seer of olive oil. Put the two together in a vessel and heat on the water bath for half an hour. Remove and place it in the sun for a month. Finally strain. For preparing orange essence procure 8 oz. dried peels of orange and mince them fine. Soak them in 12 oz. spirit in a wide-mouthed stoppered phial. Close up its mouth and set aside for 1 month. Finally filter through filter paper and store in stoppered phial. (2) You can preserve the fish and sell when fish is rather dear. Tanning of fish scales is not possible. (3) You better advertise in Classified Bargain pages of Industry.

3603 R. N. U., Dwarka—We do not deal in any article, we only supply information to our readers. All the chemicals you require may be had of B. K. Paul & Co. Ltd., 1 & 3 Bonfields Lane, Calcutta.

3604 M. S. R., Salem—(1) Before manufacturing any article you should always remember that your goods must at least be equal to



A PURLEY INDIAN CONCERN

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singers, by New Electric Process. Manufacturers of "Hindusthan" Records, Gramophones and other accessories. Catalogues on request.

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VARIETIES SYNDICATE LTD.,

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if not superior to other similar products sold in the market. After manufacturing the article you should pack in decent cartons. You can start the business with Rs 1,000. (2) In place of castile soap you may use any neutral soap. (3) Collapsible tubes may be supplied by Compagnia Italiana Tubi Metallici Flessibili Via Cervini 50, Torino, Italy and Shah & Co., 55, Ezra Street, Calcutta. (4) Plaster of Paris may be had of B. K. Paul & Co., Ltd., 1 & 3, Bonfields Lane, Calcutta and Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane, Calcutta. (5) A good recipe of dentist's moulding composition will be found in April 1933 issue of Industry. (6) For dentist's requisite you may write to The Goodwill Dental Supply Co., 9, Chowringhee Road, Calcutta.

3609 B. N. C., Lahore—Process of manufacturing sheep casing and gut will appear in an early issue of Industry.

3611 M. A. K., Agra—We have no such book. You may however write to W. Newman & Co. Ltd., 3 & 4, Old Court House Street, Calcutta.

3613 S. M. M., Imphal—(1) An article on dry cell manufacture will be found in May 1934 issue of Industry. (2) An article on electric bulb manufacture will be found in June, 1934 issue of Industry. (3) Process of making gun metal will appear in an early issue of Industry.

3618 G. R., Sialkot—You may take up small contract for building and road making. If your finance does not allow you to take up such business you may start any small industry such as bindi making, ink manufacture, soap manufacture, etc.

3623 R. T. F. C., Kakori—You may advertise in Times of India Illustrated Weekly, and Statesman. You may also appoint salesman in important towns who will personally approach the buyers and convince them to buy a pair of shoes as a trial.

3624 D. J., Jampur—You may apply rubber solution for cementing the rubber tube.

3626 D. G. P. Nasik City—There is no such school or factory where apprentices are taken for teaching celluloid toy manufacture. You may, however write to Calcutta Celluloid Works, for apprenticeship.

3627 C. W. J., Chittor—You may write to W. J. Alcock & Co., 7 Hastings Street, Calcutta.

3628 D. C., Bombay—Match making machines may be had of H. R. Brothers & Co., 81/A-C Bechu Chatterjee Street and Bhowani Engineering & Trading Co., 56, Gouribari Lane.. Shambazar, Calcutta.

3629 I. F. S., Ahmednagar—Japanese rubber shoes may be had of Ahmed Abdul B. M. Kharwar, 161/1, Harrison Road; both of Calcutta. As regards Japanese address you may communicate with Akamat-sugo & Co., 4, Awaboridori 1-Chome, Nishiku, Osaka, Japan.

3630 V. S. N. M., Samalkot—Glass bottles may be had of Calcutta Glass & Silicate Works, 6B, Kundu Lane, Belgachia, Calcutta; Bengal Glass Works Ltd., Church Road, Dum Dum, Calcutta; Bharat Glass Works, 107, Dum Dum Road, Calcutta and New Indian Glass Works, 101, Ultagtingi Main Road, Calcutta.

3632 C. L. A., Gwalior—For rubber stamp making apparatus write to Paul Bredemann, 50, Hardenberg Strasse, Leipzig, S 3, Germany.

3633 S. N., Hyderabad—(1) For sketches of a kiln you may write to W. J. Alcock & Co., 7, Hastings Street, Calcutta. (2) For glazes write to Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane, Calcutta; Abinash Chandra Dutt, 23-2, Dharamtala Street, Calcutta and B. K. Dutta & Co., 35, Clive Street, Calcutta. (3) You may consult The Making and Burning of Glazed Ware by H. Ansell and B. B. Scarle to be had of W. & G. Foyle Ltd., 119-125, Charing Cross Road, London W. C. 2.

3634 S. C. G., Myingyan—Following is a list of woollen mills: Dharamsi Morarji Woollen mills, Sudama House, Ballard Estate, Bombay; Maharani Woollen Mills Co. Ltd., Baroda. Indian Woollen Mills, Harns Road, Mahaluxmi, Bombay; Baij Nath Balmakund Woollen Mills, Anwarganj, Cawnpore and New Egerton Woollen Mills Co., Dhariwal, Punjab.

3635 A. C. S., Sadhira—Boots and shoes may be had of Indian Leather Industries, 57 Diamond Harbour Road, Kidderpore, Calcutta; Young & Co., 69, Bentinck Street, Calcutta; Imperial Shoe Factory, Egerton Road, Delhi; Akhoon Brothers, Chaura Bazar, Ludhiana and Halim Boot Factory, Cawnpore. A complete list of boots and shoe manufacturers will be found in Industry Year Book & Directory published from this Office.

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N.B:—The organisers of the Fair intends to publish a Swadeshi Industrial Directory on the opening date of the Fair and those manufacturers and merchants who want to publish their name free of charge in the Directory must send the same to the Manager, Industrial Fair, before the 12th March. Advertisements are accepted to be published in the Directory at Rs. 20 full page; Rs. 12 half page; and Rs 6-8 per quarter page. Special short advertisement 13"X3" are accepted at Rs 4. Special charge for cover page. Since the space allotted for advertisement is limited book early.

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Branch: 102-45 Clive Street, Calcutta.

3636 B. M., Raipur—Process of manufacturing bar/soap will be found in February 1935 issue of Industry.

3640 N. G. S., Conjeevaram—Ice cream making machine may be had of Sat Cowrie Dass & Co., 196, Old China Bazar Street, Calcutta.

3643 B. I. H., Khasia Hills—Typewriters may be had of G. Rogers & Co, Norton Bldgs., 23, Lall Bazar Street, Calcutta.

3644 B. C. V., Bhadra—Your son may learn any of the following industries: Ink manufacture, syrup manufacture, perfumery manufacture, soap manufacture, disinfectant manufacture, etc. You may write to the Secretary, School of Cottage Industries, 6, Rama Nath Mazumdar Street, Calcutta. Your boy may also learn watch and clock repairing, camera repairing spectacles fittings, etc.

3647 P. I. II., Rawalpindi—Glass bottles with corks and capsules may be had of Shah & Co, 55, Ezra Street, Calcutta. You should boil the paste in iron pan.

3648 S. H. M. A., Delhi—Process of manufacturing milk powder will be found in July 1934 issue of Industry.

3649 P. F. S., Bardez—Machine for coir industry may be had of Indo-Japanese Commercial Museum, 135, Canning Street, Calcutta.

3650 A. L. F., Nagpur—A list of glass manufacturers will be found in Directory of Indian Industries from which we give the following: Coronation Glass Works, Firozabad, Agra; Jain Glass Works, Firozabad, Agra; Allahabad Glass Works, Naini Allahabad; Nagina Glass Works, Nagina, Bijnor; Bankay Glass Manufacturing Co. 51, Naigum Road, Dadar, Bombay; Western India Glass Works, South Road, Panchmahal, Bombay; Bharat Glass Works, 107, Dum Dum Road, Calcutta and Jewel Glass Factory, Civil Station, Jubbulpore.

3651 G. V. S. M., Madras—For cast iron articles you may enquire of Bhadravati Iron Works, Bhadravati, Mysore; Hukum Chand Electric Steel Co. Ltd, 30, Clive Street,

Calcutta; Bengal Iron Co. Ltd., 4, Lyons Range, Calcutta and Indian Iron & Steel Co. Ltd, 12, Mission Row, Calcutta.

3653 B. K., Raipur—You better consult an engineer.

3654 S. R. K., Navsari—(1) Ammonia is not injurious to hair or skin. (2) In order to remove the defect of shampoo you may add liquor potassi 1 dr. Boil the coconut oil with liquor potassi on a water bath for some time when saponified take away from fire and add other ingredients. (3) For fountain pen engraving machine write to G. C. Law & Co., 33, Canal East Road, Calcutta.

3657 H. G. B., Hamirpur—(1) Solid Perfumes consist of a compressed mixture of rice starch, magnesium carbonate and powdered orris root, essence, etc. You may use a tablet making machine for making tablets. (2) Batteries for electroplating work may be had of S. Mitra & Co, 30, Bentinck Street, Calcutta. (4) Tin boxes may be had of Metal Decorating & Shaping Co. Ltd, 112, Narkeldanga Main Road, Calcutta. (5) In making depilatory powder you have to use any kind of sulphide either barium or strontium. You may also use quick lime and orpiment.

3659 S. H., Poona—(1) Topics on aluminium record appeared in April 1933 issue of Industry. (2) An article on gramophone record making will be found in February 1935 issue of Industry. (3) Gramophone records are manufactured by Hindusthan Musical Products & Varieties Syndicate Ltd., 6-1, Akkur Dutt Lane, Calcutta; Indian Gramophone Co. Ltd., Jessore Road, Calcutta and Viel-O-Phone Co. Ltd, Mahim, Bombay. (4) For machines you may write to W. J. Alcock & Co. 7, Hastings Street, Calcutta.

3660 M. P. G., Shikohabad—Process of cementing canvas with rubber will appear in an early issue of Industry.

3661 G. T. A., Bombay—(1) You may negotiate with Sudhindra Nath Sen, 6, Kirti Mitter Lane, Shambazar, Calcutta for preparing

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ultramarine blue. (2) For coaltar write to Turner Morrison & Co Ltd. 6, Lyons Range, Calcutta. (3) You may consult Thacker's Indian Directory published by Thacker Spink & Co Ltd., 3, Esplanade East, Calcutta. (4) For the ingredients you require write to Abinash Chandra Dutt, 23/2, Dharamtala Street and Akhoy Kumar Laha, 1, Dharamtala Street; both of Calcutta. (5) Wants to be put in touch with the parties interested in manganese stone. (6) Slates are manufactured by Bengal Slate & Cards Co., 137, Howrah Road, Howrah; India School Slate Co., 29, Ram Kumar Ganguli Lane, Shibpur, Howrah; B. D. Manufacturing Co., Agra and Punjab Scale Works, Sialkot City. (7) Wants to be introduced to owners of chalk, whiting and soft stone mines in India.

3662 M. S. W., Shwabo—(1) Mercury may be had of Banshidhar Dutt & Sons, 126, Khengrapatty, Barrabazar, Calcutta. (2) Process of making 'Parad Bhasma' will appear in an early issue of Industry.

3663 S. K. D., Comilla—For selling fish oil you may negotiate with Baikuntha Nath Sarat Chandra Chackravorty, 5, Nawab Lane, Barrabazar, Calcutta.

3667 D. S., Gohana—(1) Following is a recipe of metal-polish: Petroleum jelly 66 lbs; powdered bath brick 40½ lb; tallow 4½ lbs; stearic acid 18 lbs. Liquefy tallow in the petroleum jelly by heating then stir in the others. Turn out under-edge-runners, grinding well. (2) You perhaps mean gelatine capsule: Soak 7 lbs. of good gelatine in 10 oz. of glycerine and 60 oz. of water, then heat over a water-bath until dissolved and add any desired colour. To make it milky white colour add a small quantity of zinc oxide to the melted mass and incorporate in thoroughly. (3) In the formula of washing soap you may add potassium carbonate ½ seer. (4) For the purpose of rendering rubber articles soft and elastic again, prepare a moderately strong solution of alum in water into which lay the rubber articles for a day or two; after that time they are no longer hard and sticky.

3670 R. T. C., Pattikonda—(1) You perhaps mean emery wheel which can be made with shellac powdered fine, and a small portion of rosin, a piece about the size of a walnut to 1 oz. shellac and a piece of old vulcanised rubber about the same size which gives it toughness. Shellac about 1 oz. to 1 lb. of emery, well melt and stir about in a small frying pan, well mix the powders before applying heat. Be careful not to burn it, or get grease in it; have a ring of iron and a piece of plate iron prepared with black-lead and beer pretty thick; place the ring upon the plate and make a mould, turn the stuff into it, and well ram down evenly; put on one side to cool; when cold turn out and chuck in lathe, and with a piece of red hot iron bore a hole for spindle; after spindled put between centres, and trice up with hot iron. (2) Process of making cycle tubes will be found in December 1934 issue of Industry. You may start the business with Rs. 25,000.

3672 A. S. W., Amalner—You may start a soap factory. In the beginning you manufacture washing soap only. Afterwards you may manufacture toilet soap. Always try to place superior quality soap in the market and same standard should always be maintained.

3674 K. S. B. W., Mangalore—If you sell beedi packed in paper carton packing charges will be high so you cannot sell beedies is cheap price. But if you cannot sell at cheap price you will not be able to stand against the competition of cheap cigarettes. You better try to open agency for selling beedies simply trying 25 beedies with a thread as is done in Bengal.

3677 B. E. T. C., Bangalore City—Following is a list of metal factories of Aligarh: B. H. Agarwal & Co, Aligarh City; B. K. Bhai & Co., Aligarh and Bharat Rashtriya Karyalaya, Aligarh.

3678 N. M. U., Karachi—Address of the Institute of Engineers is 20, Strand Road, Calcutta.

3679 H. E. P., Moratuwa—(1) You may consult Match Industry in India by K. C. Sen to be had of Chakraverty Chatterjee & Co., Ltd., 15, College Square, Calcutta. (2) You may consult Cooley's Encyclopaedia of Practical Receipts to be had of the above firm.

3680 A. L. S., Sadri—(1) For nut buttons reels and thread balls write to Bombav Stationery Mart, Victoria Bldgs. Fort, Bombay; Great India Stationery Co., 365, Hornby Road, Bombay and Renown Station-Stores, Lal Bldgs., 136-A, Parsee Bazar Street, Fort, Bombay. (2) Piecegoods may be had of Mohondas Ratanji, Ganesh Chowk, M. J. Market, Bombay and Rasiklal Nagindas & Co., 32, Moolji Jetha Market, Bombay 2. (3) Wants to be put in touch with wholesale oil merchants of the Punjab. (4)

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2B, Bela Road, Delhi.

Talkie machines may be had of Chicago Telephone & Radio Co, 175, Hornby Road, Fort, Bombay; International Radio Co., P. O. Box 486, Bombay, and Continental Talkie Equipment Corporation, Movietone, Fort, Bombay. (5) For films write to Imperial Film Co., Kennedy Bridge, Bombay; Shree Krishna Film Co., 162, Dadar Road, Bombay and Pathe Cinema Ltd., Ballard Estate, Bombay. (6) Crayons are manufactured by Modgil Crayon Co, Kachery Road, Karachi; T. S. Chakrapani, A Kadai Street, Koradacheri, Tanjore and Indian Crayon Co., Governorpet, Bezvada, Kistna. (7) Slate pencils are manufactured by C. C. Parekh's Slates and State Pencil Factory, Petlad, Baroda and Bengal Slate Works, Jamalkhan, Chittagong. (8) Yes, you may start touring cinema business.

3681 A. R. S., Karachi—In Calcutta there is no regular market for cattle. There are two 'hats'—one in Goabagan and the other at Chitpore where dealers bring cows from different parts of the country for selling. At present a cow yielding 10 to 12 seers milk sells at from Rs. 150 to Rs. 200. Wants to be put in touch with dry salted fish dealers.

3683 M. H., Rawalpindi—(1) You may start small industries such as the manufacture of toothpowder, writing ink, bindi, etc. (2) Following is the process of making carrot morabba:—Carrot 1 part, sugar 1 part. Scrape off the peel of the carrots and soak them in water for one hour. Take them out and make incisions all over with heating. When soft the carrots are ladled out and allowed to drip. The carrots are then cut into pieces and cooked in syrup solution over a slow fire. When it acquires a morabba-like consistency, remove from the fire, allow to cool and pack in bottles and seal air-tight.

3684 M. R., Attili—(1) A good recipe of ply wood varnish will be found in October 1934 issue of Industry. (2) Wants to be put in touch with plywood dealers in Bombay. (3) You may apply ply wood varnish to carrom board. (4) Wants to be put in touch with manufacturers of fretworks.

3685 V. P., Cocanada—Process of manufacturing printing ink will appear in an early issue of Industry.

3686 R. D. B., Ludhiana—For a directory of Japan write to The Consul-General for Japan, 26-27, Dalhousie Square, Calcutta.

3687 H. S., Sahdol—You may start an oil mill or a hosiery factory. If the above do not suit you may take up manufacture of sporting goods which is very profitable.

3689 P. C. A. A., Koradacheri—Following are the addresses you require: Policy published from Africa House, Kingsway, London W. C. 2; Agents Journal published from Merton House, Salisbury Square, London E. C. 4; Insurance Index published by R. B. Caverly, 46, Strand, London W. C. 2; Policy Holder published from 44, Lloyd Street, Albert Square, Manchester.

3693 S. K. K., Sailu—(1) For refining coconut oil boil the oil with sufficient quantity of salt, say 2 chhatak salt per seer of oil when scum will float above. Remove the scum carefully and again boil the oil with some water and remove the scum if any. Decant the clear oil carefully and finally filter through filter paper. (2) Mix equal quantity of til oil with coconut oil. (3) Process of preparing pomade will be found in December 1934 issue of Industry. (4) A good recipe of hair oil will be found in October 1933 issue of Industry.

3694 P. C. D., Madras—The address of Homeopathic Poor Dispensary is Kankanady, Mangalore. They have no branch in Calcutta or Bombay.

3696 J. S. J., Amritsar—The process supplied to you is perfect. We cannot understand why you have not been able to bleach oil successfully. However you may treat the oil, with sulphuric acid and potassium bichromate.

3697 T. R. S. S., Madras—(1) For refining groundnut oil treat the oil with 10 per cent of its weight of fuller's earth which should be dehydrated by roasting prior to use. Mix thoroughly and then heat the mixture to 100°F and maintain the temperature constant for about 15 minutes. Lastly filter the oil through filter paper when a clear oil is obtained but the odour

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Even if you do not own a soap milling plant, we will supply you with a perfect toilet soap, with your own name. We would perfume the soap to your choice, and the colour too, you could suggest. Our soap base is guaranteed for purity, being made under the supervision of a qualified German Chemist. Ask for Samples and prices:

New milling and plodding soap machinery just received, for sale. Moderate price.
TOMSON & CO., SOAP SUPPLIERS: 129, Khetwadi, Bombay 4.

3725 Z. Assagao—Wants to be put in touch with the suppliers of carved ivory, sandalwood, sandalwood toys, etc.

3728 K. N. V., Bombay—Process of making photo on silk will be found in September 1934 issue of Industry.

3731 M. V. T., Bombay—Yes you may start import business with Rs 6000. You may import fancy goods and novelties from Japan and Germany and sell in the wholesale market. It is not possible to deal with the technique of import business in our limited space. You may however consult some book on import trade. You may consult Importer's Handbook by J. A. Dunnage.

3732 S. C., Saharanpur—(1) For rosin you may write to Indian Turpentine Rosin Co. Ltd., Gwaloli, Cawnpore and Jallo Rosin & Turpentine Factory P. O. Box 124, Lahore. (2) Caustic soda may be had of Imperial Chemical Industries, (India) Ltd., 22, The Mall, Lahore. (3) Crude carbolic acid may be had of Bengal Chemical & Pharmaceutical Works Ltd., 31, Chittaranjan Avenue, Calcutta and Turner Morrison & Co. Ltd., 6, Lyons Range, Calcutta. (4) Powdered rosin is known as ground rosin. Take some rosin and grind it to powder. (5) If you just go through the chapter III dealing with materials used in disinfectants you will understand everything you require. (6) Methylated spirit may be had of Dr. Bose's Laboratory Ltd., 45, Amherst Street, Calcutta and Beg Sutherland & Co. Ltd., Sutherland House, Cawnpore. (7) Rosin spirit is an extract of rosin with methylated spirit. Rosin oil is oil obtained by distilling rosin. (8) You may filter creosote and use. (9) Washing soda may be had of Imperial Chemical Industries (India) Ltd., 18, Strand Road, Calcutta. (10) All the other chemicals you require may be had of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta. (11) Dissolve the permanganate of potash in creosote.

3733 S. M. M. S., Rawalpindi—The exact figure of consumption of thread ball in India is not available. There are already some firms in India manufacturing thread balls.

3734 M. R. K., Larkana—(1) Process of manufacturing lozenges will be found in Profitable Industries published from this Office. (2) Process of bread and biscuit making will be found in Home Industries published from this Office. (3) Machines may be had of W. J. Alcock & Co., 7, Hastings Street, Calcutta. (4) Tin cans may be had of Metal Decorating & Shaping Co. Ltd., 112, Narkeldanga Main Road, Calcutta. (5) Essences may be had of Paradise Perfumery House, 75, Colootola Street, Calcutta.

3737 M. Z. H., Patna—Process of making zarda will appear in an early issue of Industry.

3739 M. M. C., Allahabad—(1) an article on blotting paper manufacture appeared in January

1932 issue of Industry. You have to invest at least Rs 10000. (2) Sodium benzoate with charcoal will remove tartar to a certain extent. (3) It is not possible to remove hair permanently. (4) We are not aware of any such cinema company who take camera men as apprentice. (5) You may write to Page-Davis School of Advertising, Delhi 20. (7) We generally deal with industrial and commercial enquiries.

3742 J. C. S. L. A., Ludhiana—For Japanese cement write to Mitsui Bussan Kaisha & Co. Ltd., 100, Clive Street, Calcutta.

3743 M. O. C., Jalalpur—(1) You better consult a physician. Following is a recipe of infant's cordial: Light carbonate of magnesia 2 gr.; sodium bicarbonate 1 gr.; spirit of chloroform 1 min; glycerine 5 min; peppermint water to 1 fl. dr. (2) Following is a good recipe of pain balm: Vaseline 44 parts; methyl salicylate 10 parts; oil of cajuput 2 parts; oil of eucalyptus 2 parts; menthol 2 parts; wool fat 20 parts. Mix thoroughly and put in wide mouthed bottles. It may be rubbed gently over the affected parts. (3) You may also use soluble starch to the ink powder. (4) Handworking machines may be had of Industrial Machinery Co., 14, Clive Street, and Subalchandra Dutt & Sons, 39, Clive Street; both of Calcutta. (5) Following is a list of loan offices: Bengal Central Loan Co. Ltd., 2, Lall Bazar, Calcutta. Mahajan Banking & Trading Co. Ltd., 7B, Clive Row, Calcutta and Luxmi Industrial Bank, 80, Chowringhee Road, Calcutta.

3745 P. C., Tuticorin—For typewriter ink pad write to G. Rogers & Co., 23, Lall Bazar Street, Calcutta.

3746 A. C. M. M., Bellary—(1) In order to remove the defect of the soap manufactured by you increase the proportion of caustic soda to 19 seers and prepare the soap by semi-boiling process. (2) You should not add more than 5 p.c. washing soda as filling agent. (3) Good soap cannot be prepared with groundnut oil alone. You may take coconut oil and groundnut oil in equal quantity. (4) You may try the following formula: Coconut oil 10 seers; groundnut oil 10 seers; caustic soda $3\frac{1}{2}$ seers; water $7\frac{1}{2}$ seers;



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silicate 5 seers; water for silicate 4 seers; washing soda 1 seer and water $\frac{1}{2}$ seer. Follow the semi-boiling process.

3747 S. C. L., Champaran—All the articles you require may be had of Banshi Dhar Dutt & Sons, 126, Khengrapatty, Barrabazar and Madhab Chandra Daw, 1, Armenian Street; both of Calcutta. We have no other business except publication.

3748 J. K. K., Bombay—Process of tinning on a large scale will appear in an early issue of Industry.

3749 A. H., Sorbhog—(1) For tattooing machine write to General Electric Co., Magnet House, Chittaranjan Avenue, Calcutta. (2) Refer your query to the Hindustan Musical Products & Varieties Syndicate Ltd., 6-1, Aknur Dutt Lane, Calcutta.

3750 J. S. A., Srinagar—For road tar oil write to Tar Products Distributing Co. of India Ltd., 12-2, Chve Row, Calcutta.

3751 B. P. S., Benares City—Cigarette manufacturing machinery may be supplied by Messrs T. V. Lynn & Co., 58, Forbes Street, Fort, Bombay. Other particulars concerning the industry may be supplied by them on application. An elaborate article on cigarette manufacture appeared in October 1934 issue of Industry. For further information consult "Tobacco from Grower to Smoker" by A. E. Tanner to be had of W. & G. Foyle Ltd., Charing Cross Road, London W. C. 2. We charge only as. 4 for each query to be replied by post. Queries unaccompanied by the fee are replied to in query columns of Industry.

3752 G. S. S., Ludhiana—(1) For knitting machine please write to Indo-Japanese Commercial Museum, 135, Canning Street, Calcutta. (2) Addresses of Japanese book sellers are not known. You may refer to the Consul-General for Japan, 26-27, Dalhousie Square, Calcutta. Your other queries will be published in Trade Enquiry Columns.

3754 I. E. C., Bombay—Tobacco for cigarettes may be supplied by Indian Leaf Tobacco Development Co., Khajauli, Darbhanga, and Chirala, Guntur; Hyderabad Tobacco Co.,

Hyderabad, Sind; City Tobacco Co., Bangalore City. A detailed list may be found in Industry Year Book and Directory. See also No. 3751 above. Our book on tobacco does not deal with cigarette manufacture.

3755 S. K. C., Bombay—A paint factory in the moderate scale will require about a lac of rupees. The machinery for the plant may be supplied by M. H. Dinshaw & Co., 47, Apollo St., Fort, Bombay. They will furnish with the estimate on application.

3756 R. S. W., Dacca—Pearl ash is potassium carbonate. It may be supplied by Imperial Chemical Industries (India) Ltd., 18, Strand Road, Calcutta; Calcutta Mineral Supply Co., 31, Jackson Lane, Calcutta.

3757 M. P. W., Berhampur—An elaborate article on Rubber Stamp manufacture appeared in June 1934 issue of Industry.

3758 H. C. B., Minsukia—An elaborate article on milk and milk products appeared in July 1934 issue of Industry.

3759 S. N. C. B., Palghat—The Tamil equivalents for cinnamon, mace, cubeb and catechu are Lowangapatta; Jadikay; Val-milaku; and Voadalam, Karangalli, and Kasku-kutta respectively.

3760 A. K. S. B., Berhampur—For particulars of the books published by The Malayan Information Agency, Malaya House 57, Charing Cross Road, London S. W. 1. please write to the firm direct.

3761 M. A. R., Vizianagram—(1) Copper talisman may be supplied by Abdul Matlif Harun Rasid, 43, Clive Street, Barabazar, Calcutta; Adhikari & Co., Tampatti, Barabazar, Calcutta. (2) Elaborate lists of different companies dealing in different commodities will be found in Industry Year Book & Directory.

3762 M. C. C., Karachi—Addresses of School Journals are not available. You may write to the Director of Public Instruction of different Provinces for lists of schools and communicate with each school for the information.

3763 M. I. K., Shahdol—(1) A list of oil merchants follows. Detailed list may be found in Industry Year Book & Directory: Bamapada Ghose & Sons, 17-4, Canal West Road, Calcutta; Khimjee Hansraj, 165, Lower Chitpore Road, Calcutta; Lalit Mohan Seal & Sons, 243, Manicktalla Main Road, Calcutta; Shah Bros., Richey Road, Ahmedabad; Ismail Tar Mohammed, 6, Tank Street, Upper Duncan Road, Bombay; Ko. Awe Ya, Myothil Qr. Pyawbwe, Burma; R. N. Waghmare, Hinganghat, Wardha; Radha Krishna Sitaram, Couperganj, Cawnpore. (2) For market rate see commercial gazette and daily journals. (3) Oil extracting mills may be supplied by Balmer Lawrie & Co. Ltd., 103, Clive Street and Volkart Bros;

WANTED

Respectable and influential agents and organisers on decent pay or handsome commission according to ability.

THE SANGUINE INSURANCE CO., LD.

Head Office:—98/4, Clive Street,
Branch Office:—83/12, Belgachia Rd., Cal.

Works, Jagannaikpur, Coconada and Madras Swadeshi Match Works, 113, Tiruvallur High Road, Madras. It is not possible to start celluloid industry with small capital. You may however start a candle factory, with small capital.

3787 S. M. M., Karachi—Formulas you require will appear in an early issue of Industry.

3788 B. L. A., Patna—(1) World Directory is published by Kelly's Directories Ltd., 186, Strand, London W. C. 1. (2) For German Directory Write to Leipziger Messamts G.m.b.H., 6, Liebig St., Leipzig, Germany.

3789 D. D. K., Karachi—(1) A good recipe of liquid depilatory will appear in an early issue of Industry. (2) As regards metal Polish please write clearly which formula you experimented and what is your defect when we shall supply you further information on the subject.

3791 V. K. J., Travancore—You may utilise the heat wasted in tea shop by boiling some other thing according to your own device. But if you use it without safety valve it may burst at any moment due to excess of steam. Sorry we cannot help you in securing any job for you.

3792 P. S. R. S., Narnaul—You may learn hosiery industry at the Government Hosiery Institute, Ludhiana. Hosiery machine may be had of Indo-Swiss Trading Co., 2, Church Lane, Calcutta.

3797 B. K. M. C., Benares City—Thank you for your valuable suggestion.

3798 T. S. S. A., Badagara—(1) You may write to Taylor & Challen Ltd, Birmingham, England for tin spray making machine. (2) Carboard box and envelope making machine may be had of John Dickinson & Co. Ltd., Grosvenor House, 21, Old Court House Street, Calcutta.

3799 P. V. C., Goa—Cane is itself flexible, it does not require any chemical treatment. For softening cane you may dip it in water.

3801 J. U. B., Poona—(1) Following is a recipe of gripe water: Spirit ammon Co. 3 dr; potash bicarbonate 1 oz. 3dr.; symple syrup 32 oz.; aqua caraway concentrated 1 oz.; aqua anise concentrated 1 oz.; aqua anethi concentrated 2 oz. and distilled water 4 pints 4 oz.; Dose for an infant, half a teaspoonful; two months old, one or two teaspoonful. The dose may be gradually increased. (2) Stock labels may be had of Shah & Co., 55, Ezra Street, Calcutta.

3806 P. J. R., Nellore—It is not possible to manufacture aluminium sulphate from chinaclay. For books on pottery you may write to Thacker Spink & Co. (India) Ltd., 3, Esplanade East, Calcutta.

3807 B. B. T., Kanauj—Following is a recipe of non-alcoholic perfume: Synthetic hly otto 50 parts; turpineol 40 parts; linalol 10 parts;

synthetic musk crystals 2 parts. Mix and put in stoppered phial. Shake frequently until dissolved.

3808 M. S. H., Peshawar City—You perhaps mean gelatine capsule which is prepared as follows: Soak 7 lbs. of good gelatine in 10 oz. of glycerine and 60 oz. of water, then heat over a water bath until dissolved and add any desired colour. To make it milky white add a small quantity of zinc oxide to the melted mass and incorporate it thoroughly.

3809 J. S., Kathiawar—Hing is extracted from a species of herb which is found wild in Eastern Persia, and other localities. Hing is obtained by wounding the upper part of the root, from which a small quantity of gum escapes and is collected. The living root is then incised daily or every two or three days until the exudation adhering to it is exhausted. The whole mass consisting of alternate layers of root and gum-resin is packed in skin. As found in the market the resin consists of blackish brown brittle mass of extremely fetid odours always mixed with slices of the root. In Bombay it is sometimes adulterated by the addition of gum arabic, and the cheaper sorts contain an undue proportion of root. Adulteration with sliced potato also takes place.

3810 S. S., Ujjain—There is no such institution known to us. You better try to be an apprentice in a photographic concern.

3811 T. H., Taungdwingyi—(1) An article on celluloid manufacture will be found in February 1934 issue of Industry. (2) For colouring oil you may use oil soluble colour.

3813 B. R. N., Bombay—(1) You better consult a physician. (2) Marathi equivalent for ajawan is wova. For making ajawan water take ajawan seeds 3 lbs. and water 6 quarts. Put the ajawan seeds in a cloth bag and place in a suitable distilling apparatus. Heat to boiling and collect the distillate thus obtained for 4 or 5 hours. (3) Lipsalve is used for colouring lips. (4) For grain alcohol write to D. Waldie & Co. Ltd, 8, Clive Street, Calcutta. (5) Wants to buy a home printing press in Bombay. (6) Your other queries are not in our line.

3816 E. P. W., Akyab—Silk yarn may be had of Pohnul Bros., 33, Canning Street, Calcutta. They deal in all kinds of silk yarn.

3817 G. B. C., Delhi—Ferro silicon may be had of Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane, Calcutta.

3818 S. D. P. M., Jaipur City—Formula of saddle bar soap is not available. You will find a formula of saddle soap in our book Manufacture of Soap which you have already got.

3819 O. S. A. W., Ambala Cantt—For timber required enquire of Belliaghata Box & Timber Co., 8, Chaulputty Road, Belliaghata,

Calcutta; Howrah Mechanical Wood Works, 254-2, Panchanantala Road, Howrah and Sanyal Banerjee & Co. Ltd., 84, Clive Street, Calcutta.

3820 O. A. H., Hsipaw—Process of gun barrel bluing will appear in an early issue of Industry.

3821 K. B. K., Indore—(1) Following food articles contain vitamin C in large quantity; cabbage, celery, lemon juice, orange juice, lettuce juice, onion, radish, raspberries, tomatoes, turnips and green vegetables. (2) For improving your general health you should do regular exercise, walk in pure air, take nutritious food and observe purity in mind and action. If possible you may go to some healthy place for a change.

3822 A. S. A., Jharsaguda—(1) It is not possible to manufacture vegetable ghee without machinery. (2) Process of manufacturing cheap washing soap will be found in December 1934 issue of Industry. (3) In refining groundnut oil and castor oil you may adopt the process of refining sesamum oil which will be found in December 1934 issue.

3823 S. G. B., Palakol—Soap making machines may be had of W. J. Alcock & Co., 7, Hastings Street, Calcutta and J. Mayr, 1, Mission Row, Calcutta.

3824 Y. M. K., Bombay—(1) It is very difficult on our part to suggest a formula of chemical fertilizer which will suit the soil of your district without exactly knowing the nature of the soil. (2) To manufacture sulphate of ammonia pass ammonia gas obtained by burning coal through sulphuric acid. The gas is absorbed by this acid forming ammonium sulphate. (3) Castor cake is obtained by expressing oil from castor seeds.

3825 L. I. W., Raipur—Creosote may be had of Bengal Chemical & Pharmaceutical Works Ltd., 31, Chittaranjan Avenue, Calcutta and Turner Morrison & Co. Ltd., 6, Lyons Range, Calcutta.

3826 S. E. K. M., Colombo—We do not deal in any machine. You may however write to Dr. Bose's Laboratory Ltd., 45, Amherst Street and Industrial Machinery Co., 14, Clive Street; both of Calcutta for the machineries you require.

3827 J. W., Ootacamund—Annual subscription of Industry is Rs 4 and a single copy 6 as.

3828 V. K., Chavakacheheri—(1) Bottles may be had of Shah & Co., 55, Ezra Street Calcutta. (2) Labels may also be had of the above firm. (3) Perfumes may be had of Paradise Perfumery House, 75, Colootola Street, Calcutta. (4) Cardboard boxes may be had of Pioneer Carboard Box Manufacturing Co., 54, Ezra Street, Calcutta. (5) Chemicals may be had of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta.

VOL. XXV. No. 300.

3829 B. M., Raipur—(1) In making wood-ash lye take water 90 parts and wood ash 10 parts. Then treat the oil with lye process of which already appeared in January 1933 issue of Industry. (2) Casein is not used in soap making. (3) Soap prepared by cold process begins to shrink after a month. (4) Soap sweats due to excess of salt and caustic soda. (5) You may use citronella oil for suppressing the bad odour.

3830 D. R. B., Chaibasa—A good formula of required washing soap will appear in an early issue of Industry.

3831 J. M. B., Pabna—All the ingredients you require may be had of Abinash Ch. Dutt, 23-2, Dharamtala Street; Akhoy Kumar Laha, 1, Dharmtala Street and Joy Gopal Dutt & Bros., 40, Clive Street; all of Calcutta.

3832 B. A. F., Dhar—Process of manufacturing thymol crystal will appear in an early issue of Industry.

3833 M. T. B., Rangoon—(1) Juice of mehndi leaves may be used as hair dye. (2) Other formulas you require will appear in an early issue of Industry.

3834 R. I. C., Choolapuram—(1) Synthetic camphor is not manufactured in India. (2) For machineries you may write to Consul-General for Germany, 3, Lansdowne Road, Calcutta. (3) You may utilise ice in packing and preserving fish and sending to distant places where fish is not available. (4) We cannot send you any Articles and Memorandum of Association of any company. You may write direct to the firms.

3836 M. W. D. L., Rangoon—(1) Refer your query regarding German sausage industries to the Consul-General for Germany, 3, Lansdowne Road, Calcutta. (2) Regarding goat bile write to the Consul-General for Japan, 26-27, Dalhousie Square, Calcutta. (3) You better consult a physician.

3837 H. G. L. S., Mysore—(1) Rubber and celluloid toys may be supplied by Araki & Co., 26, Minami Kynhojimachi 1-Chome, Higashiku, Osaka, Japan and Kyodo Shokwai Ltd., 21, Andojibashidori 1-Chome Minami-ku, Osaka, Japan. (2) Kurimoto Honten, Minami Kynhojimachi 2-Chome, Higashi-ku, Osaka, Japan may supply you pictures.

3838 B. T. C., Jalalpurkiknan—You may utilise sand in making porcelain ware and in making cement pottery. Sand is also used in large quantity for building construction. It is very difficult on our part to suggest for which purpose the sand is suitable without knowing the exact nature of the sand.

3839 E. K., Badulla—(1) For analysing soap you may write to Sudhindra Nath Sen, 6, Kirti Mitter Lane, Calcutta and C. S. Marathe, Vile

Parle, Bombay. (2) Sunlight soap is manufactured by Lever Brothers Ltd, Union House, St. Martin's-le-Grand, London E. C. 1 Umbrella brand soap is manufactured by J. Crosfield & Sons Ltd., Gresham College, Basinghall Street, London E. C. 2

3840 C. C. T., Coimbatore—For ticket printing machine write to John Dickinson & Co. Ltd, Grosvenor House, 21, Old Court House Street, Calcutta and K. Banerjee, 8, Canning Street; both of Calcutta.

3842 J. P. W., Golaghat—(1) There is no such factory known to us. As far as our knowledge goes book binding firms do not take any apprentice for teaching book binding work. (2) Book binding is taught in Pannalal Seal's Vidya-mandir, 5/1, Olai Chandi Road, Calcutta.

3846 B. T. C., Madras—Following is a formula of scented betelnut: Betel chips 20 parts; catechu 2 parts; cloves 2 parts; nutmeg 4 parts; cardamom (minor) 4 parts; cinnamon $\frac{1}{2}$ part; cubeb 2 parts; mace 2 parts; saffron $\frac{1}{2}$ part; musk $\frac{1}{2}$ part. Digest the betelnut chips together with other ingredients bruised in some water for a week by which the perfume compounds will be soaked by the betelnut and thus the perfume will permanently remain when dried. You should use first class betelnut which you should secure locally.

3847 A. P. B., Tirupur—An article on electroplating appeared in June 1932 issue of Industry.

3850 V. S. T. M., Rajnandgaon—(1) A good formula of printing roller composition will be found in March 1934 issue of Industry. (2) Following is a composition of type metal: Lead 69.2 parts, antimony 19.5 parts, tin 9.1 parts and copper 1.7 parts.

3852 T. C. C., New Sukkur—(1) Essences may be had of Paradise Perfumery House, 75, Colootola Street and Sikri & Co., 55-8, Canning Street; both of Calcutta. (2) Process of manufacturing all kinds of soaps will be found in Manufacture of Soap published from this Office.

3854 K. M., Malappavam—Process of gilding will be found in Independent Careers for the Young published from this Office. Price of the book is Re. 1/8/-.

3857 S. N. S., Lahore—It is advisable for you to use ready made varnish available in the market. You may write to Akshoy Kumar Laha, 1, Dharamtala Street and Abinash Chandra Dutt, 23-2, Dharamtala Street; both of Calcutta.

3858 N. K., Kathiawar—(1) Threadball making machines may be had of Oriental Machinery Supply Co. Ltd., 20, Lall Bazar Street, Calcutta. Yes the business will be profitable if you can produce the thread as strong as foreign ones. (2) Business of bidi manufacture is profitable and at the same time it does not require much capital. (3) Required thread

may be had of Moolji Sikka & Co., 51, Ezra Street, Calcutta.

3860 P. L. K., Ajmer—For the required copper wire you may write to Electric Trading Co., 54, Ezra Street; B. K. Singh & Sons, Chatawalla Galli, and Commercial Electric Co., 63, Ezra Street; all of Calcutta.

3861 L. T., Razmak—(1) Yes you may start a hosiery factory at Bannu. (2) Hosiery machines may be had of Indo-Swiss Trading Co., 2, Church Lane, Calcutta. The firm will supply you with an estimate for starting a factory. (3) For training in hosiery write to Government Hosiery Institute, Ludhiana. (4) You may arrange with some good motor driver to teach you motor driving otherwise you have to join any motoring school which will be rather costly. (5) For learning harmonium you may arrange with some local musician deft in harmonium. (6) You may start tape making, celluloid goods manufacture, etc.

3865 B. H. Y., Gadag—(1) You may negotiate with Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane, Calcutta for selling magnetic stone and copper sulphide. You have perhaps misunderstood because copper sulphide is obtained in natural state. (2) First grind ochre very finely. Add some boiled linseed oil with it and mix thoroughly and add some turpentine oil and manganese dioxide as drier.

3868 K. R., Tanuku—Reply to your query appears under No. 3528 in these columns.

3869 V. S., Bezwada—(1) Refer your query to the Consul-General for Japan, 26-27, Dalhousie Square, Calcutta. (2) Following is a list of journals you require: Journal of the Institution of Electrical Engineers E. & F. N. Spon Ltd., 57, Hay Market, London S. W. 1; Electric Journal, 2, Norfolk Street, Strand, London W. C. 2 and Electricity, 36, Maiden Lane, Strand, London W. C. 2 (3) You may consult Gas and Oil Engine Management by M. P. Bale published by W. & G. Foyle Ltd., 119-125 Charing Cross Road, London W. C. 2. (4) You have to invest at least Rs. 50,000 for manufacturing gramophone. For machines you may write to J. Glascoe & Co., 49-51, Eastcheap, London E. C. 3 and Appleton, 96, New Bridge Street, N/Tyne, England. (5) Yes you may take up umbrella manufacture. (6) You better consult an engineer. (7) Make a mixture composed of 3 parts of alcohol and 4 parts of ether keep in a well-corked bottle and when celluloid articles are to be mended, paint the broken surfaces over with the alcohol and ether mixture until the surfaces soften, then press together and bind, and allow to dry for at least 24 hours. (8) You may use lactometer for testing purity of milk.

3870 M. P. G., Shikohabad—(1) For remedying the defect of snowcream take potassium

carbonate 1 part; water 50 parts and stearic acid 5 parts. Melt the stearic acid in water-bath add the potassium carbonate and water. Stir continually when completely saponified add perfume according to your taste. (2) Coconut oil cannot be kept in liquid state during the winter season. (3) Following is a formula of good coconut hair oil: Coconut oil 16 oz.; sandal oil $\frac{1}{2}$ oz.; oil of rose geranium 2 oz.; oil of lavender $\frac{1}{2}$ oz.; oil of bergamot $\frac{1}{2}$ oz.; oil of petit-grain 1 dr. Take the coconut oil and add into this the other ingredients one after another with constant stirring when the oil will be ready for use. (4) Glass bottles may be had of Shah & Co., 55, Ezra Street, Calcutta.

3872 L. V. S., Vizianagram—(1) Following is a list of pottery factories: Government Porcelain Factory, Malleswaram, Bangalore; Bengal Potteries Ltd., 45, Tangra Road, Calcutta; Cochin State Pottery Works, Cochin; Gwalior Potteries Ltd., Lashkar, Gwalior and Standard Pottery Works, Alwaye, Travancore. (2) You may write to the Director of Industries 40/1A, Free School Street, Calcutta for training regarding porcelain industry. No other institution is known to us.

3874 P. L. B., Ambala Cantt—The use of carbon disulphide is recommended to destroy ants' nests on floor. A little of the disulphide is poured into the openings of nest. The volatile vapours of the disulphide will penetrate the chambers of the nest in every direction and if sufficient has been used will kill, not only the adult insects, but the larvae as well. A single treatment is generally sufficient.

3875 G. S. Z., Ferozepore Cantt—Process of manufacturing all kinds of soap will be found in Manufacture of Soap published from this Office. You may manufacture soap with Rs 1000 on a small scale. You may negotiate with R. Ghose, 8, Kripanath Lane, Calcutta for learning soap manufacture by correspondence. Soap making machines may be had of J. Mayr, 1, Mission Row and W. J. Alcock & Co., 7, Hastings Street; both of Calcutta.

3876 C. L., Pilibhit—(1) Stationery articles may be had of G. F. Kelner & Co. Ltd., 32, Chowringhee Road; Nilmoney Halder & Co., 106, Radha Bazar Street and C. M. Sur & Co., 105, Radha Bazar Street; all of Calcutta. (2) Novelties may be had of K. G. Maniar, 55, Canning Street, Calcutta. (3) Other processes will appear in an early issue of Industry.

3877 J. S. J. S., Amritsar—In refining rape oil 1 per cent. of sulphuric acid is thoroughly intermixed with the oil in an efficient agitator at a temperature not exceeding 40 deg. C. and the whole allowed to rest for twenty-four hours 60 to 70 per cent of warm water at about 60 deg. C is then well intermixed and the whole allowed to stand for some days; a watery acid

liquid separates at the bottom with a layer of flocculent "foots" above which is the clarified oil which is drawn off and again agitated with warm water to wash out any residual suspended vesicles.

3878 J. K. K. J., Madura—You may use sulphuric acid for bleaching the oil mentioned by you. You should use in mineral oil and turpentine oil. The quantity should be from the 2 per cent. You may also consult Vegetable Oil Industry published from this Office; also vide No. 3877. A good formula of liquid soap appeared in May 1933 issue of Industry.

3881 D. S., Gohana—(1) The Indian Soap Journal is published by The All-India Soap Makers' Association, 22, Canning Street, Calcutta. (2) A good recipe of lice killer appeared in April 1933 issue of Industry. (3) You may increase the proportion of barium sulphide. (4) Prepared suet is refined suet it has no other name. You may try B. K. Paul & Co. Ltd, 1 & 3, Bonfields Lane, Calcutta for prepared suet, and petrolatum. (5) Rotten stone may be had of Calcutta Mineral Supply Co. Ltd, 31, Jackson Lane, Calcutta. (6) Soap lees is an inferior quality of soap which settles at the bottom of the soap pan. (7) There is no remedy to prevent appearance of white colour on soap if washing soda is used more than 5 p.c. of the soap.

3884 P. N. R., Pudukotah—You may start a sugar factory with Rs. 25000. If you go through October and November 1934 issues of Industry you will get an idea as how to start a sugar factory. You may also start tape making, typewriter ribbon making, button making, etc.

3887 A. T. C. L. Rangoon—Coal tar may be supplied by Turner Morrison & Co., 6, Lyons Range, Calcutta. Linseed oil may be had of Gouripur Co. Ltd, 5, Lyons Range, Calcutta; Narain Dass Lachman Dass, Cawnpore (U.P.); and Mohin & Co., Hatpookur Road, Lilloah.

3889 U. M. B. C., New Delhi—(1) Formula of shampoo appeared in January 1935 issue of Industry. (2) Pure borax is baborate of sodium. It is an ordinary article commonly known as Shohaga may be had of Benias, and of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta. (3) Others are various kinds of soap and may be supplied by soap makers such as Calcutta Soap Works, Ballygunj.

3890 S. L., Meerut City—(1) As you have got a fair practical knowledge in poultry farming you can start one with the capital you have in small scale. (2) A glue industry will require about 5 thousand rupees. You may go through the article on glue industry which appeared in December 1931 issue of Industry. (3) You can take up other small industries such as ink, snow, cream, dentifrice, soap, etc. In these days of hard competition a sum of Rs 100 is too poor a capital to suit any paying industry.

REVIEW OF BOOKS

UNSOLVED PROBLEMS: NATIONAL AND INTERNATIONAL By John S. Hecht. Published by Jarrolds Publishers (London) Limited, Paternoster Row, London E. C. 4. Pages 288, price 6 sh.

The present volume makes a most welcome addition to the growing bulk of literature on the fascinating subject of world economic crisis. There is already a welter of contradictory opinion on the subject. Mr. Hecht is a learned economist and a keen original thinker. His exposition of the subject will clear much confusion settling in the minds of the public about the causes of the present wide-spread unemployment attended by the evils of high taxation, industrial depression, restriction of credit, etc. The author makes a striking analysis of the present acute economic condition of the world and has brought to bear a large volume of economic doctrines still ruling the fundamental economic principles of the day to explain that the possibility of abolishing poverty depends upon a solution of the wages problem and a just distribution of wealth. He examines critically the origin and development of the current theory of wages and shows how the current practice of wage payment has been vindicated by the law of supply and demand. Mr. Hecht makes a critical study of the alternative solutions of wages problems and evolves a new theory which is as suggestive as it is interesting. According to his plan, profit sharing must be made compulsory in every industry and among industries. This will necessitate the organisation of production or the compulsory rationalisation of all industries. A solution of social problems can only be achieved by authoritative intervention in trade, industry and finance—not necessarily by nationalisation or Government ownership of the means of production and distribution.

The Part II of the book is devoted to the discussion of international problems which are systematically evading the persistent attack of the economists. He refutes the idea advanced by certain thinkers that free trade will bring the present cataclysm to a termination and will result in the creation of good will among nations and lasting international peace. He elucidates how the current theory of international trade influences the wages and comes to the conclusion that universal Free trade will reduce wages throughout the world, which in its turn will disrupt society. Mr. Hecht concludes that a sound theory of international trade involves the re-

servation of the home trade for home producers, which by stimulating production will solve social problems and promote peace of the world. The book in fact is greatly thought-provoking and suggests remedies which deserve careful attention from economists.

WILL WAR COME IN EUROPE ? by H. R. Knickerbocker. Published by John Lane the Bodley Head Ltd., Vigo Street, London W. 1. Pages 276, price 5 Shillings.

Mr. H. R. Knickerbocker undertook a wide tour in Europe to have the opinions of people who are at the helm of international politics as regards the probability of another war in Europe in the near future. News are often flashed on the newspapers foreboding the imminent outbreak of a war on a more gigantic scale than ever and men in the street hear of the preparations being made in all the countries with hairs on their ends. The present book will no doubt serve to fulfil the curiosity of such men and those who dabble in politics. The author has interviewed Mussolini, Dolfuss, Chancellor of Austria, Admiral Horthy, Regent of Hungary, King Boris of Austria, King Alexander of Yugoslavia, President Masaryka, M. Barthou, Foreign Minister of France and a host of gentlemen who are best qualified to answer the question. The book makes very interesting reading and brings into prominence the international undercurrent of politics and aspirations and achievements of the countries in Europe and the crystallised opinion in favour and against the naval agreements and disarmament. The triumph card, says the author, lies in the hand of Adolf Hitler, though he has declared a score of times that he wants peace now and for always. He has made nearly all Europe believe it by making non-aggression Pact with Poland for 10 years. Mr. Knickerbocker concludes that finally though Germany aims at a great many goals that could only be achieved by war, they could be achieved of course only by a victorious war and in contemplating war Germany too must contemplate which might be the results of a lost war.

WORLD ECONOMIC SURVEY, 1933-34. Published by League of Nations, Geneva. Pages 365, price in wrappers 6 sh., cloth bound 7s. 6d.

The present volume is the third of an annual series undertaken by the League of Nations and has been prepared by Mr. J. B. Conliffe of the Economic Intelligence Service of the League of

Nations. The Volume begins with a description of the visible signs of economic recovery from the lowest depths of the long depression and the national plans of recovery after the termination of the Monetary and Economic Conference in London and brings the story up to the end of July, 1934. It is, in fact, an outstanding work of immense national and international importance and deals with the economic developments between July, 1933 to July, 1934.

As in the 1932-33 volume, adequate use is made of statistical information regarding prices, production, international trade, wages, public finance collected from all over the world by the Economic Intelligence Service of the League of Nations. Additional interest attaches round the chapters on the credit Movement and capital market. This is a document that will prove helpful for commercial men and financiers who will get from it the current trends in world production, finance and business conditions.

PROBLEMS OF TRANSPORT CO-ORDINANCE IN INDIA by S. K. Guha published by Oxford University Press, Post Box 31, Bombay. Price/Re 1, pages 77.

Owing to recent competition between road and railway, transport problem has engaged the attention of the commercial community as a whole. The book which has been compiled from four lectures delivered by the author at Bombay is very informative and will prove useful to those interested in transport problem. The author first deals with history and development of roads in India. Then he discusses the merits and demerits of road transport and railway transport side by side. Next he deals with the evil effect of uneconomic competition between rail and road transport and among the road transporters themselves. To remedy against this competitive waste the author suggests co-ordination among the transporters themselves which in terms of the author should be defined 'as the working together of different forms of transport services in such a way that each performs that part of the work for which it is best suited all the time in the interests of the passenger public and the trade, industry and commerce of the country.'

TRACING HISTORY BACKWARDS by Stephen King-Hall and K. C. Boswell Published by Messrs. Evans Brothers Ltd, Montague House, Russell Square, London W.C.1. Agents in India are I.S.S.D., Central Avenue South, P.O. Dharamtala, Calcutta.

This book on British history is especially written for the children of tender age so as to equip them with the power to think for themselves and to give them some idea of the main

lines of development of the British Constitution; of the essential features of its economic structure; the procedure of buying and selling; and the development of the British Empire as a whole.

In these days it is highly desirable to link up the school history with present day problems and this is what the little book has done. It does not in any way pretend to be a new or authoritative book on British history. It simply deals with the facts of present-day life from different points such as, the variety of present day life, the jobs of present-day life, the trade of present-day life, the money of present day life, development of government, etc.

OUR VISIT TO INDIAN ELECTRIC LAMP MFG. CO. LTD.

Electric bulbs are now in huge demand in India for illumination purposes. In the early years of the nineteenth century these might have been considered as articles of luxury enjoyed by a favoured few but recently with the progress of electrification in cities and towns, railways and merchant vessels, trams and buses, these have come to be reckoned as articles of daily necessity, to the rich and the poor alike. The electric lamps are tiny things by themselves but the manufacture of these stuff demands special technical skill and complete mastery over details. The art of making these things is reserved as trade secret by experts in foreign countries and it was beyond the imagination of many only a few years ago that a factory manufacturing up-to-date electric lamps would be set up in India in near future. It is therefore pleasing to learn that electric lamps are being made in India. All credit goes to Mr. N. N. Mazumder, A. M. E. E., Assoc. I. E. E. (London), who had been to England and the Continent for studying the technique of electric bulb manufacture for starting an electric bulb factory at 1, Swinhoe Lane, Ballygunge, Calcutta, against tremendous odds. Only a few days ago we paid a visit to their factory at Ballygunge. Mr. Mazumder, showed us round the factory, and explained the various stages of manufacture, for which he richly deserves our thanks.

The process of making electric lamps involves much physical and chemical knowledge and delicate handling. In its essential features the process consists in physical and chemical treatment of the filament to withstand electric currents, mounting it properly, and exhausting air from the bulbs prior to sealing up the cap. The factory is equipped with up-to-date machineries bought from England, America and the Continent. It is a sight to see how the machines act automatically and make out the flanges, stitch the hooks of the central spider on which

the filament is to be wound, set the 'spider' in place in the bulb and finally evacuate the lamps at a high temperature with up-to-date Sprengel exhaust pumps.

The preparation of the filament to render it uniformly luminous and durable taxes the best energy of the factory. Every part of the filament is examined under the microscope before it is finally sent to be mounted in bulbs. The portions of the filament which show any signs of defects and lack of uniformity are rejected. This is a most important step which assures the long life of the bulb and will surely go to establish the reputation of the firm.

Before the lamps are packed for marketing, these are put on the edge rack where the voltage of current to which they are exposed is increased gradually to make them durable and a fair percentage of them are tested so far as their durability, current consumption and candle power are concerned. Mr. Mazumder, we are given to understand, is making extensive experiments even now to effect further improvement of quality and reduce the cost of production.

We have nothing but admiration for the efficient manner in which the work is being done in the factory. We are glad to hear that the output of the company is being readily consumed in the market and that the management would think of extensions as soon as their funds permit. We think that the Indian public should make it a point to patronise their goods as they are made with Indian capital and Indian labour and are not in any way inferior to the foreign imported stuff from countries which started manufacture long years ahead. Our Municipalities, District Boards, Hospitals, etc., should help the infant institution by placing orders with them.

INDIAN MATCH MACHINERY

EVER since the impetus all Indian industries received from the Swadeshi movement started in 1905 various attempts were made to manufacture matches in India with imported machinery which were very costly, but all ended in failures. Some attempts were also made to manufacture matches on cottage industry scale to meet local demands. These attempts also failed. Hundreds of such small factories sprang up in the country. These factories worked with small machines, indigenous of course, which were like nut-cutters and could cut slices of wood with 'weight pressure into splints and veneers. It was left for Mr. H. C. Ray who owned a cottage factory using late Dr. Mahendra Chandra Nandy's nutcutter-like machine to see that the system was very crude and inefficient. This was about fourteen years ago, when Swadeshim received a fresh impetus

from the non-co-operation movement which added a momentum to the match industry also. Within a year's time or so, the Indian match industry received a still greater impetus from the imposition of import duties on foreign matches. Yet these factories had to close down, one by one. Why?

Mr. Ray saw that a mere appeal to patriotic sentiments could not stand an industry on good stead. The methods of production must be thoroughly efficient to make the products highly finished so as to enable them to stand foreign competition. Mr. Ray saw this could partly be achieved by producing improved machinery, as efficient as but cheaper than foreign machinery.

Mr. Ray partly from a business motive and partly from a patriotic urge set himself to this self-chosen task. His hard labour and thorough application was at length crowned with success. Mr. Ray manufactured his improved chopping machine which made a vigorous stir in the market. Gradually he completed manufacturing almost the whole set of machinery such as Chopping, Peeling, Pasting, Labelling, Box-wrapping and various other machines necessary for a complete match factory. But all he has done with an eye to the needs of the middle-class youths who can provide themselves with moderate capital.

Before starting H. R. Brothers & Co. Mr. Ray was Engineer and one of the founders and organisers of the Bhowani Engineering & Trading Co. and partner, Engineer and Expert of the Karimbhoj Match Manufacturing Co. His contributions to these concerns were enormous. Today Mr. Ray is a widely reputed match expert. During the rains when matches generally get damp, most of the factories suffer a good deal for want of a damp-proofing formula for chemicals. Mr. Ray's "Damphol," the damp-proofing composition, has saved many factories from closing their doors during the rains.

Mr. Ray also turned his thoughts to manufacturing sugar machinery when the sugar industry got an impetus from the imposition of protective duty and there had been a great demand for sugar machinery. Several other Bengalees subsequently came up into the field, but no one succeeded in manufacturing 30" sugar centrifugal, which is no doubt a very difficult task. There was a general notion in the market that no country-made 30" sugar centrifugal would work well; but Mr. Ray has given a lie direct to this superstition. His 30" centrifugal works very smoothly without giving the least trouble. He is now manufacturing all his machinery from Messrs H. R. Brothers & Co., of 81A/C, Bechu Chatterji St., Calcutta.

NOTICES & REVIEWS.

[Manufacturers sending specimen and samples of their products for notice and review may please note that no notice is published of medicinal preparations and allied substances in this section.]

Office Paste.

We have received from Pearl Industrial House, Suddar Bazar, Rawalpindi a sample phial of office paste. The preparation is found to be defective and should be improved slightly to make it marketable.

Scented Betel Tablets and Pills.

We are exceedingly satisfied with the above preparations sent to us by Tansen House Ltd., Jalalpur, Gujrat. Of these the Tan Sen Pill is found to be sweet, aromatic and refreshing while the betel tablets produce excellent flavour when chewed with pan. We wish them a wide sale.

Toilet Soap.

We have much pleasure to receive a box of glycerine toilet soap from its manufacturer E. S. Patanwala, 182-184, Abdul Rehman Street, Bombay No 3. We appreciate the product very much as it is found to be equal, if not superior, to any foreign make. We wish it a wide market.

Padlocks.

We have the pleasure to acknowledge receipt of a set of three brass padlocks of 1" size having 6 levers each from The International Lock Factory, Kalia Street, Aligarh, U.P. The special features of this set is that each lock has its own non-interchangeable key and that the key of one can not open or close the another but a master key, which is provided with this set, will open and close all the locks. We congratulate the makers for constructing padlocks in such a novel way.

Swadeshi Cigarettes.

We are glad to receive several sample tins and several packets of cigarettes manufactured by The Upper Sind Cigarettes Manufacturing Coy., Post Box No. 30, Sukkur, Sind. The Cigarettes marketed by them are in seven different brands, such as Regal, Lucky Five, Three Star, Kashmir, Laila Majnu, Begum and Sun brand. All these varieties appear to us to be composed of superior grades of tobacco leaves available in this country. We congratulate the manufacturers for bringing out such nice stuffs suitable for every pocket.

Buttons.

We are glad to receive a few samples of ivory finished bone buttons from Messrs. Samson & Co., Triplicane, Madras. The buttons appear to be good and serviceable.

Calendars & Diaries.

We have thankfully received 3 calendars and 1 pocket diary from the Globe Nursery, 25, Ramdhone Mitter Lane, Calcutta.

Sree Satyanarayana Parimala Factory, Jagannohan Palace Square, Mysore has sent us 2 calendars and 2 varieties of agarbatties.

We have much pleasure in acknowledging receipt of two beautiful pictorial calendars from Messrs. P. V. Rajan & Co, Madras G.T.

We are in receipt of a serviceable diary and note book from Linotype and Machinery Ltd., 21 A Bow Bazar Street, Calcutta.

Madan Manjari Pharmacy, 177, Harrison Road, Calcutta has sent us 2 Rajvaidya Narayanji Keshavji diaries.

Messrs P. Lodge & Co., Patent & Trade Mark Agents, 71, Canning Street, Calcutta have sent us 3 calendars and 1 pocket diary.

Our thanks are due to Messrs. Eruch D. Engineer & Co., 95, Apollo Street, Bombay in respect of 2 wall calendars.

Messrs. Balatshi & Co., 14, Ramaswami St., G. T. Madras have sent us 1 pictorial calendar and 2 packets of tooth powder.

Messrs. Yadike Bros., Bangalore City have also sent us a calendar.

Our acknowledgment is due to The Asian Poultry Research Institute Experimental Farm, Near G. P. O., II, Connaught Road, Poona for a big-typed sheet calendar. They are the importers and breeders of poultry.

We thankfully acknowledge receipt of a wall calendar from Ganges Printing Ink Factory Ltd., 22, Canning Street, Calcutta.

We are glad to receive a sheet calendar from Messrs Norton & Co, 16/1, Baker Thiruvengada Mudali Street, Choolai, Madras. They are the dealers of all sorts of printers' sundries such as Brass rules, bronze powder, etc.

Our thanks are due to J. Mayr, 1, Mission Row, Calcutta for a useful note book.

Messrs. Dass Brothers, 37, Strand Road, Calcutta have laid us under obligation with a big-typed calendar.

We have much pleasure in acknowledging receipt of 5 pictorial calendars from The Aronda Chemical Works, Bombay No. 4.

A New Vernacular Weekly.

We have much pleasure to receive copies of *Nabasakti*, an illustrated Bengali literary weekly dealing with the current topics of the week, short stories, criticism, etc. We welcome the issue and wish it a long and useful career. It is published from 11/5, Karaya Bazar Road, Park Circus, Calcutta. Annual subscription is Rs. 4 only.

Trade Enquiries.

(To communicate with any party write to him direct with name and address given below mentioning *Industry*).

3638 K. B. Kotak, Lalit Block 1st Floor, Vile-Parle, Bombay—An expert in cotton line for 30 years wants a financier for jointly working partnership business in exports and imports to Japan and Continent.

3639 The Karnatak Trade Agency Co., Bingaghati, Karwar—Want to be put in touch with the manufacturers of wooden combs.

3665 S. M. Sayeed & Co, 5, Byranjung Street, Mount Road, Madras—Want to be put in touch with firms dealing in horse hair in large quantity.

3676 The Ahmedabad Mill Cloth Supplying Agency, 1074, Sarangpur, Ahmedabad—Want to be put in touch with merchant dealing in cotton and silk piece-goods throughout the world.

3691 G. B. Bhonsle, Bhonsle Bldg., Karachi—Wants to be put in touch with dealers in chrome ore and spun yarn.

3695 The English & Scottish Joint Co-operative Wholesale Society Ltd., Cochin—Want to be put in touch with firms in Africa supplying cashew nuts.

3709 Choudhury Bros, Fakirtola Road, Noakhali—Can supply tamarind and seemul cotton in large quantity.

3726 E. Phillips Kurien, Muvatupuzha, Travancore—Can supply Malabar Hill products, spices, pepper, oil seeds, etc.

3730 V. V. Acharya, Ariyanur., Salem—An expert in manufacturing gas mantles for Petromax lights wants services on remunerative terms.

3740 West Coast Match Co, Sattur—Want to buy glass powder in very large quantity.

3752 Gurdial Singh Sodhi, Sodhi Bros. Knitting Works, Ludhiana—Can supply cotton, wool and silk cutting waste.

3765 Suriya Bhakta Joshi, Thahiti, Bhagabati Bahal, Nepal—Wants services of a person expert in pottery manufacture.

3793 S. D. M., Mohideen, 40, Galkapana Watte Road, Grand-Pass, Colombo—Wants to be put in touch with the manufacturers of Indian made cheap shoes, imitation jewellery, ear-rings, etc.

3856 Ramanath Roy Chowdhury, Haflong, Cachar—Can supply canes both 'jali' and 'sundi'.
3890 Shiam Lal, 4, Baidwara Street, Meerut—Wants to be put in touch with the buyers and exporters of bristles.

APRIL ISSUE OF INDUSTRY.

(In the Press).

The April issue of *Industry* which will be the Jubilee Number will contain many interesting and instructive articles in addition to the usual features such as Small Trades and Recipes; Formulas Processes and Answers; Reader's Business Problems; Brief Queries and Replies. Any friend of our subscribers will get a copy free as sample on applying to the Manager, *INDUSTRY OFFICE*, Shambazar, Calcutta.

INDUSTRY

Is a monthly Journal of Technology and Handicrafts, and Commerce. The rate of subscription is as follows:—

Indian Rs. 4. Foreign 9s.

The charge is for complete yearly volume only, including postage. V. P. and Registration fees As. 3 are separately charged.

BUSINESS NOTICE.

Industry is published in the first week of every month. Subscribers will receive only the number from April to March comprising a complete volume for one year's subscription, unless they mention otherwise.

Subscription money is always payable in advance or by V. P. P. The foreign subscription should be sent by B. P. O.

At the time of sending a V. P. P. only the current number is generally sent. The previous issues of the volume are sent per bookpost on receipt of the value of the V. P. P.

NOTICE TO ADVERTISERS.

All charges for advertisement from old and new parties are strictly payable in advance and no request for realisation by V. P. P. is entertained unless substantial deposit is previously made.

Contract especially as regards position is not valid unless confirmed by us in writing and accompanied by cash in sufficient time. Advertisement when published in other places than ordered for is payable at the rate scheduled for that position.

Ordinary advertisement forms close on 20th of the month and all copies and remittances must reach this office at least two days before the date, and for special issues, 10 days before that unless otherwise notified.

For rates and other particulars write to:—

Manager, *INDUSTRY OFFICE*,

22, R. G. Kar Road, Shambazar, Calcutta.

'Phone B.B. 3858.

Industry

THE MAGAZINE FOR MANUFACTURERS & BUSINESSMEN.

VOL. XXVI.

CALCUTTA, APRIL, 1935.

NO. 301.

AN ERA OF ENTERPRISE.

LIKE sunshine and air, the blessings of God are plentifully given to all who aim straight for success.

On the threshold of a new era may we inspire our readers with confidence in the future of the country and in their capacity for a forward movement.

Many have been helped to start it, during the last 25 years, by this magazine. Let there now be a united effort and a spirit of progressiveness in our service to the Country. India expects her sons to be full of life and ambition for creation of new work, always and for every one.

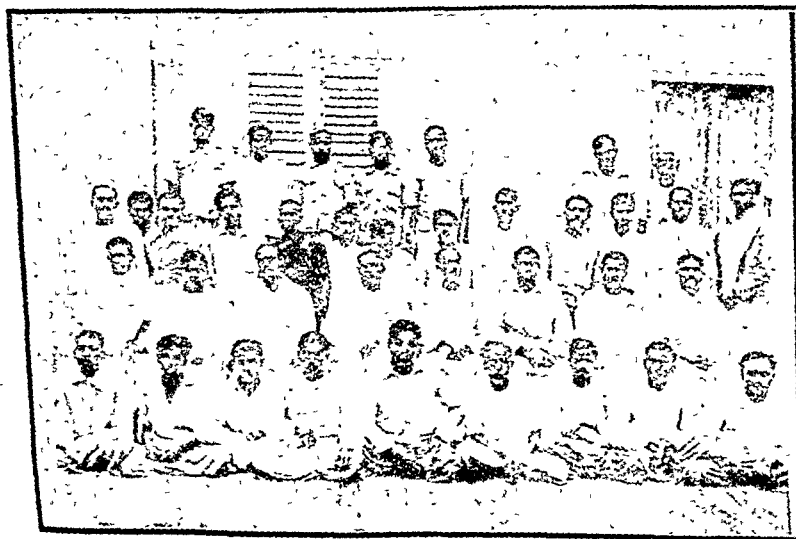
OUR PROSPECT & RETROSPECT.

ON the eve of the Jubilee celebration of INDUSTRY our thoughts go back to April, 1910—just a quarter of a century ago—when the paper first saw the light of the day. Odds were against starting an industrial magazine at that time. The flicker of enthusiasm for swadeshi witnessed at the tail of the much resented Partition of Bengal had almost died out: quite a large number of industries which sprang up at that age had come to grief: the chances of success in the field of industry seemed remote: and any encouragement on the part of the State to the tottering infant industries of the country was conspicuous by its absence.

Yet if there were any country which was destined to play a predominant role in the industrial world, it seemed to be India. Her resources of raw materials and cheap labour seemed inexhaustible. Simply there was no great desire evident

among her people to pursue industrial careers. The only established industries, so to speak, at the beginning of the twentieth century were the cotton mills, jute mills, tea, indigo, coffee, engineering, etc. and it must be admitted that the majority of them were ushered into being under the initiative of foreign capitalists and experts. Except the cotton mills and the cottage industries which were mostly disorganised and scattered, India could not claim any industry as her own.

An analysis of the failure of many of the industrial concerns which cropped up with the swadeshi movement brought to light the rankling fact that a thorough knowledge of technical subjects and acquisition of skill were indispensable for the growth and development of industries. The companies were mostly constituted on the spur of the moment and counted much on the patriotic sentiment of the



THE STAFF RESPONSIBLE FOR PUBLICATION OF INDUSTRY.

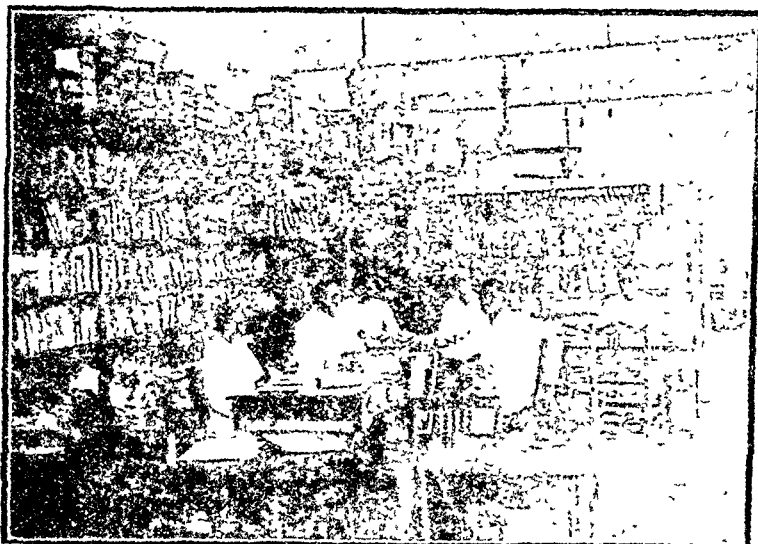
The second row sitting on chair consists of the Asstt Editors.

The third row standing is of the Manager's Dept.

The first row sitting on ground and the last row are men of the Press Dept.

THE EDITOR'S
DEPARTMENT WITH
THE LIBRARY.

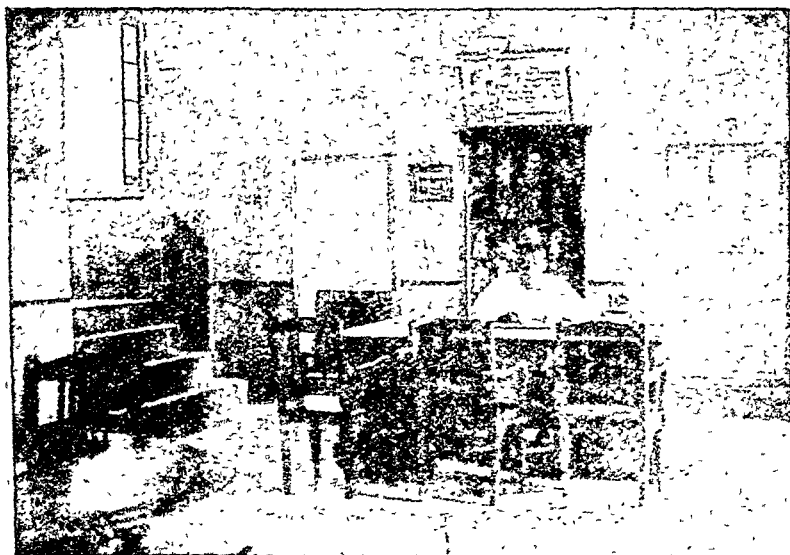
The Assistant Editors
are working for the
Jubilee Number.



people who, they thought, would support their products for all time to come, even if they were costlier and inferior in quality. They miscalculated. The Indian customers, be it said to their credit, extended their ungrudging patronage for a period sufficiently long to permit the industries to stand on their own legs, improve the quality, standardise the products and bring out a reduction of cost of their production. The industries knew too late to their great discomfiture that the experts, trained in foreign countries, at the helm of their affairs, found themselves placed in an uncomfortable position. The foreign methods of manufacture did not permit of being followed *in toto* in India. The Indian conditions required modifications which again demanded careful study and observation. Then again there was a sad absence of intelligent labour, having at least a fair knowledge of the technical points involved in the processes, to help the experts materially. The technical schools did not

deviate by an inch from their old routine of creating a number of surveyors, mistries and artisans. They did not think it worthwhile to give a new orientation to their programme by offering scopes for truly industrial careers to the educated middle classes who were daily experiencing the approaches to the avenues of clerical service and learned professions closing up before them.

It was these national and economic considerations which prompted the conductors of the paper to bring out a magazine like *INDUSTRY* to propagate industrial and commercial information among the Indians and kindle a class consciousness for industrial and commercial pursuits. It was started with the object of "creating among our countrymen an industrial sect who would learn to use every moment of their active life in doing something to the advantage of themselves and the community—in manufacturing articles of every day use—in building up useful trade—in making themselves tho-



THE MANAGER'S
OFFICE

MR N. BANERJEE,
the present Manager.

roughly practical men with knowledge of a variety of money making means and ways."

And industrial and commercial information was what India needed most. The Departments of Industries and Commercial Information did not yet function. The University system of education did not supply this want. The study of sciences, as prosecuted in the colleges, is mainly restricted to the elucidation of fundamental principles on which physics and chemistry are based. It is not devoted to the understanding of the practical applications of these sciences to the satisfaction of human wants. And yet it is these practical applications of sciences which have made Europe, U. S. A., and Japan what they are to-day. If India is to fall in line with them, she also cannot dispense with first-hand details of the practical applications of the general truths discovered by the men of science. If India was not in an industrial mood it was because she did not possess technical

knowledge; while, on the other hand, it cannot be gainsaid that the acquisition of technical knowledge would undoubtedly stimulate industrialism in the country.

Peeping through the veil of the last twenty-five years of our humble career, we have the unique gratification that we have not lived in vain. Our hopes and aspirations are in the way of gradual realisation, our tireless efforts to disseminate technical information have already begun to bear fruits. There is now a fair industrial awakening in the country. Public opinion has been educated on matters concerning industrial interests of the country: manufacturing instincts of the countrymen have been sharpened; and unless the screws of commercial safeguards fettered for the New Constitution of India are closed too tight, the renaissance will not receive any severe set-back. India has now definitely turned a corner. She has now seen that industries and commerce are the life blood of the nation, which alone can keep the national system

vigorous, and healthy. National and international undercurrents of thoughts have also tended to drift India on an industrial landing. INDUSTRY has been straining every nerve to bring about this consummation and it has the satisfaction that it had at least some share in bringing about this salutary change in the outlook of the Indian intelligentsia.

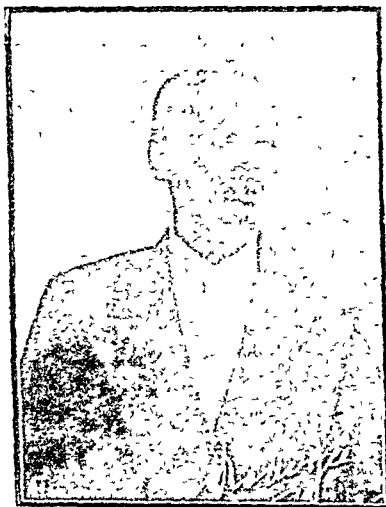
INDUSTRY made its entry in an unostentatious way. It was a four-folder. It was housed in a small room. Grim resolve, undaunted energy and unquenchable desire for national service were the only capital that the proprietors had at their command. They took up the work in right earnest. Theirs was not to seek loud applause from the public gallery by creating sensations but theirs was to put silent, solid, constructive work to promote an all-round industrial development in the country. From the very beginning every issue was packed with information about processes of manufacturing various articles of necessity with small capital and

was filled with particulars about utilising the spare time to add to the generally poor national income or to remove unemployment. Articles on agriculture, gardening and allied industries and advancement of handicrafts formed regular features. The paper fortunately appealed at once to the public and satisfied their curiosity about industries and handicrafts. It continued with renewed vigour with the self-imposed task of propagation of industrial information and of supplying money making ideas for ready use by its readers. Shortly people felt interested and began to start small industries on their own initiative—a desideratum INDUSTRY strove for. A bond of sympathetic friendship soon grew up between the conductors of the paper and the readers. They looked up to the paper in case of their difficulties for practical help and suggestions. They dictated the subjects to be discussed in the coming issues. In fact INDUSTRY became a readers' paper in the true sense of the word.

THE COMPOSING
AND MAKE UP
DEPARTMENT.



The Intertype machines
are seen at the further
end of the Hall



MR. M. M. BANERJEE—in Charge of
Publishing of Industry Publications.

It was soon found that the scope of the paper must be enlarged and the standard considerably improved to meet the gradually complicated requirements of the industrial public. The management did not hesitate to stake their all to rise equal to the occasion. They added considerably to their stock of printing equipments. They had launched the paper with a noble mission and they saw that their purpose was not defeated. They kept the torch of knowledge burning and must thankfully acknowledge the valuable help received from their clientele, without which they could not make the paper what it is now.

Then came the Great War with its devastating results. The whole order of things was altered. But like most misfortunes it was not without a silver lining. It offered India opportunities to expand industrially. The imports of foreign goods falling short of the requirements of the country stimulated Indian industries. These could easily thrive under the cover

of high prices—a sort of invisible protection to the infant industries. INDUSTRY was not slow to notice the chances that lay before the country and laid out schemes month after month for new industries which could take advantage of the abnormal times and secure a footing before the war ended. The number of pages devoted to each number of the magazine was further increased and to cope with additional work, the office was removed to the commodious building it now occupies.

When the war did come to a successful termination the Government of India got the breathing time to take stock of the events which had occurred in the meanwhile. It saw a large number of new industries, iron and steel, paper, chemicals, leather, textiles, cement, glass, ceramics, paints, galvanized wares, pens, pencils, buttons, hosiery, etc., etc., had already got a firm hold in the country and at least some of them were of immense importance to the country, being key industries or industries essentially required for national defence. With the cessation of the War and the inauguration of Reforms under the Government of India Act, 1919 events in India took a new turn.

Close on the heel of the Reforms came high import tariffs to meet the increased expenditure of the Government of India. Though essentially meant for revenue purposes, these high tariffs gave a welcome fillip to a number of industries and actually fostered the manufacture of matches, aluminium wares, enamel wares, trunks and safes, stationery goods, perfumery, syrups and condiments, water-proofs, chemicals and

drugs, surgical apparatus, engineering and electrical goods, soap, cement, etc.

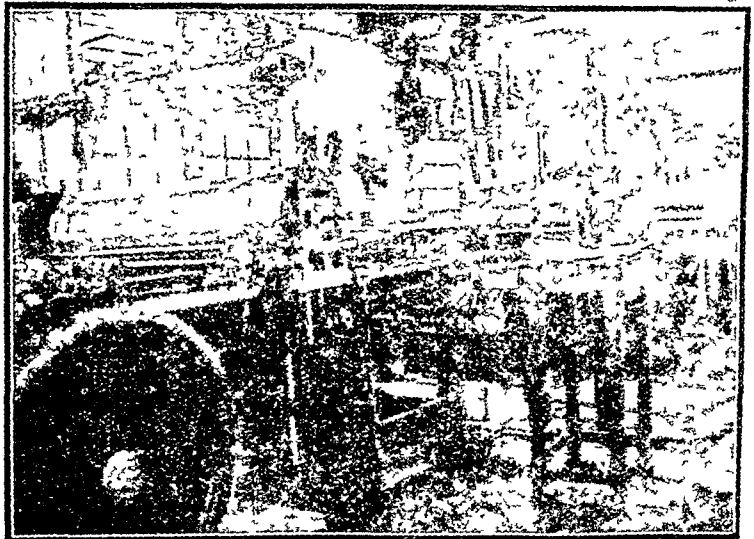
If the war period may be called the period of industrial renaissance in India, the post war period may be deemed as a period of consolidation. Foundations of many useful industries were laid and adumbrated during this period. INDUSTRY took a proud share in this work of industrial expansion. It spared no pains to throw open the secrets of manufacture—a close preserve of the industrially advanced countries. It chalked out new avenues of profitable employment and suggested new industries which had chances of flourishing in near future. It was at this stage that the various Departments of Industries came into existence one after another in consonance with the memorable despatch of the Secretary of State for India accepting the two fundamental principles underlying the recommendation of the Indian Industrial Commission—first, that in future the Go-

vernment should play an active part in the industrial development of the country; secondly, that the Government cannot undertake this work unless provided with adequate administrative equipment and forearmed with reliable scientific and technical advice.

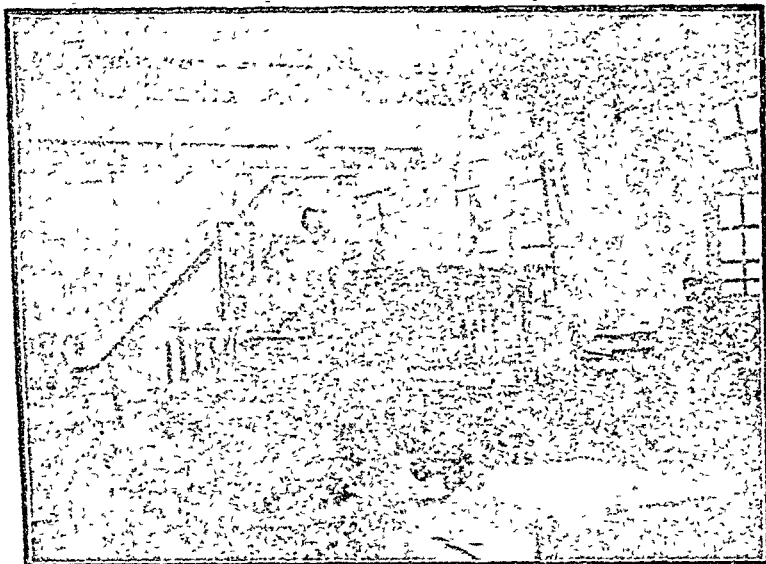
But this spell of industrial prosperity was to be short-lived. Foreign countries which were so long engrossed in manufacturing war materials had now large surplus products to export after meeting their own requirements specially as their capacity of output had increased inordinately during the war-period. Cheap foreign imports threatened the very existence of Indian industries.

India soon launched upon a policy of discriminate protection under certain conditions which have now become too well known to require recapitulation here. A number of industries soon came under the operation of discriminate protection. Though a half measure and more often

THE MACHINE ROOM.



The battery of Printing machines on which 20,000 copies of Industry are Printed every month



THE MACHINE ROOM.

Another Section.

than not annulled by depreciating exchange factors, this saved a large number of industries from imminent collapse due to the uneven competition of foreign commodities.

Then came the heavy economic depression which engulfed the world before it. The industries had a difficult time ahead in spite of the temporary stimulus imparted by the civil disobedience movement initiated by the Indian National Congress. The chief industries which were benefitted by the movement are cigarette and beedi making, ink and fountain pens, perfumery, drugs, etc. One of the latest big industries in India is the sugar industry which has practically made it possible for India to do without foreign sugar. The expansion has been almost phenomenal. Only a few years ago the imports of sugar formed a most important item in the list of Indian imports and now factories newly started in all the provinces in co-operation with the old ones produce annually 450,000 tons of

sugar which is nearly sufficient to meet Indian consumption.

During all these periods—periods of renaissance, period of growth, period of expansion and period of consolidation—INDUSTRY has attempted in a modest but serious way to help industrial regeneration of India and inaugurate an industrial millennium when there will be useful employment and sufficient food and necessities for all. It has studied the requirements of the age and has suggested a graduated series of a new industries involving greater and greater technical skill and knowledge, as stand the chances of success under the ruling conditions. Industries for small capitalists, middle-sized and cottage industries and subsidiary industries for millions of agriculturists who have to spend periods of enforced idleness extending over 6 months in the year and big industries to be worked on a large scale have alike engaged its attention. The aim, the conductors of the paper know very well, is too lofty to be attained

in the near future. The fulfilment can only come after strenuous struggle and helpful co-operation on the part of capitalists, labour and technicians alike.

It is a welcome fact that the thaw of economic depression just begins to break. The time ahead must be of immense potentialities to the country. The idea of industrial self-sufficiency has possessed the nations, especially those who are industrially backward. The markets which were the close preserve of India are now assailed by foreign merchandise or are shutting out foreign exports. India should now concentrate on the exploitation of the raw materials of the country for the preparation of goods in demand in the country. New utilities must be found for them and the decaying home industries must be organised to give them a new span of life. It is useless to mourn over their decadence. It is time for action. On their ashes should be built new industries utilising the labour and skill of the artisans engaged in those industries. The bellmetal industry, for example, has dwindled but it has been possible to divert the artisans and harness them to the manufacture of aluminium and metal-ware and various brasswares now come into daily use. Plans for the rejuvenation of other decaying industries and re-

talising them into prosperous middle sized factories must be thought out. Furthermore, the import list should demand a critical examination. It is now time India analyses how far she can dispense with the foreign manufactured products and make them at home. It does not pay to export raw materials to bring them back in the manufactured state. It is sheer loss of wealth and means unemployment among the masses.

All this requires infinite painstaking, far-sight and constant application. INDUSTRY is determined to strive for this noble end more than ever. It has so long worked unaided and single-handed. With the valued co-operation of the various Departments of Industries and Commerce its work might have been far easier and speedier. Standing on the threshold of a new epoch it hopes there will be greater understanding between the Government Departments and INDUSTRY in the years to come to evolve a formula which will heal the economic ills which the Indian body politic is suffering from. Above all, it craves the same indulgence and guidance from its band of readers who have an honourable share in any achievements which stand to the credit of INDUSTRY.

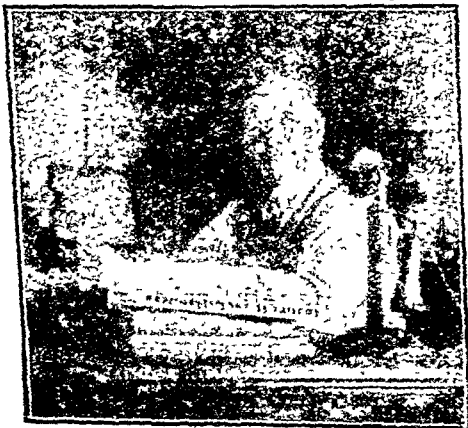
We hereby convey our heartiest and most grateful thanks to the hundreds of our readers and subscribers who have sent us enthusiastic letters of congratulations on Industry reaching the 26th year. We look to our readers for inspiration in the New Era so that in the time to come Industry will be a readers' paper, more than ever.

Messages of Greater Future.

A WORTHY ACHIEVEMENT.

MR A. T. WESTON, MSc, Director of Industries, Bengal, Calcutta writes—

"Your Journal INDUSTRY edited and run as an out and out Bengalee enterprise—as far as I am aware—is unique in the Province of Bengal, if not in India. In my view there is not the slightest doubt that in recent years there has been a marked change in the attitude of the educated young men of Bengal in the direction of industrial enterprise. While the Department of Industries of the Government of Bengal stakes its claim to a large share in the influence that has led to this development—we also gladly acknowledge that the Journal INDUSTRY which is now nearly completing its 25th year of publication has also played a very large and worthy part in this development. I wish it even greater success and influence in the future."



Mr. A. T. Weston.



Mr. G. D. Birla.

EVILS IN THE WESTERN INDUSTRIAL SYSTEM.

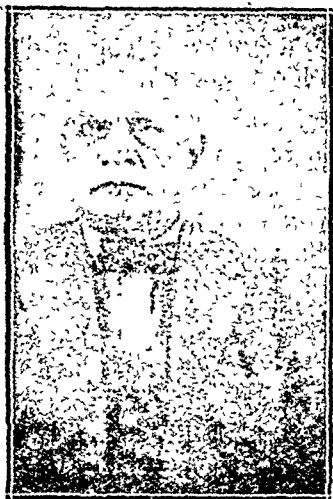
MR. G. D. BIRLA, Millowner, New Delhi writes:—

"I congratulate the INDUSTRY on the completion of the 25th year of its life. During the last 25 years, India has made great strides in industrial pursuits and if it will continue to progress steadily without reproducing the evils associated with the industrialisation of the Western countries, it will have done a marvellous thing. Let the INDUSTRY help in moulding the correct policy."

COMMERCIAL BASIS OF INDUSTRIES.

SIR HARI SINGH GOUR, Ex. M.L.A., Nagpur writes:—

"I wish to convey my warmest felicitations upon the INDUSTRY completing its twenty five years of public usefulness. The future of India lies in the development of her industries. She has a ready



Sir Hari Singh Gour.

and even hungry market at her door for the output of her industries, provided they are run as all industries should be upon a strictly commercial basis. No industry can afford to thrive unless it is able to withstand world competition and no industry can fail to do it if it is well equipped and well managed and both the management and the workmen feel that in turning the raw produce of the country into serviceable commodities they are rendering a dual service one to themselves and another, no less valuable, to their own country.

India is even now an essentially agricultural country, but in all modern countries agriculture has long since been industrialized and India cannot lag behind. Her productivity is low because her methods are primitive. There is no use making a virtue of one's poverty when poverty is the product of one's own creation. A high Japanese statesman once asked me a question—"How is it that your country is so rich but your countrymen so poor?"

The answer is obvious: my countrymen are still living in the mediaeval age. To them time has made no difference. But time has taken its revenge. India is now the most populous country upon earth. Early marriages, compulsory married life has developed one great industry that of man-breeding, with the result that India has added no less than 34 millions to her population during the last decade. How are these teeming millions to live?

India has no colonies to absorb her overflow population. Her standard of life is pathetically low, taking all in all, probably the lowest upon earth. Her only salvation lies in the development of her industries. And those who serve the cause of her industrialization are serving her well and the INDUSTRY which pilots them to that goal deserves well of all true patriots who love their country and wish to see it rise in the scale of nations."

DIVERSIFICATION OF AVENUES OF EMPLOYMENT.

Mr. NALINI RANJAN SARKAR President, Federation of Indian Chamber of Commerce, Mayor of Calcutta writes:—

"The journal which completes its 25th year has been doing good work for instilling enthusiasm about industrial undertakings among our young men. It is now admitted on all hands that one important way in which the present menacing problem of our middle-class unemployment is to be fought is the diversification of avenues of employment, and to that end it is essential that our young men should be made more industrially and commercially minded. The INDUSTRY, which makes it a feature to give in its pages helpful and practical suggestions about starting and working



Mr. Nalini Ranjan Sarkar.

small industries, is no doubt performing a very valuable service. And I think that its claim that unemployment is scarce among its readers is legitimate.

I wish the journal a still more successful career in the service of our people."

INDUSTRIALLY MINDED INDIA.

MR. J. N. BASU, MLC, Calcutta writes:—

"Your Journal broke new ground in the field of periodical publications in Bengal. Literature and politics were the themes which occupied the attention of the Press in this country almost from the time that the first periodical was established.

The literary bend that was thus given to the people of this country has resulted in the present unsatisfactory state of affairs. A very small number of the rising generation acquire the desire to engage in trade or industry. The sphere of clerical and professional employments

became overstocked several years ago. You saw the need of giving a different impetus to the mind of the people of this country. If your attempt succeeds, there is no reason why in the sphere of commercial activity our people should not attain as prominent a place as they have attained in the professions and in the services.

We are grateful to you for your pioneer work. I trust that the work will be continued with the perseverance you have displayed in the past until the end in view is attained."

SMALL SCALE INDUSTRIAL ACTIVITIES.

MR. AMRITLAL OJHA, M.I.M.E., F.R.S.A. (London.) President, Indian Chamber of Commerce, Calcutta writes:—

"I have been watching with great interest valuable services rendered by INDUSTRY ever since it first saw the light of the world. A small handy pamphlet not being much seriously taken at that time, the magazine has now grown up to be possessed of immense vitality and resourcefulness which are indicative of still greater success. Its rise is not meteoric. It had to struggle hard for the fulfilment of its noble mission for the last 25 years. I am glad to note that INDUSTRY has succeeded in proving its worth by opening new avenues hitherto unexplored and by inducing many a young man to take up small scale industrial activities.

I congratulate Mr. K. M. Banerjee the versatile editor of the magazine who has spared no pains in solving the most acute problem of under employment to his readers who looked to him for inspiration. I wish him and his journal a very prosperous and happy life."



Mr. Ramananda Chatterjee.

CRUSADE AGAINST UNEMPLOYMENT.

MR RAMANANDA CHATTERJEE, Editor, *Modern Review*, Calcutta writes:—

"I congratulate INDUSTRY on its long career of usefulness and hope it will be still more successful in fighting unemployment indirectly in the years to come than it has been in the past."

INDIA'S INDUSTRIAL PROBLEMS

SIR M. de P. WEBB, C.I.E., O.B.E., Karachi writes:—

"Hearty congratulations to INDUSTRY on the completion of its twenty-fifth year of publication. By its wise advice and sound exposition of the motive that should inspire all productive efforts, namely an honest endeavour to render good service to all concerned,—INDUSTRY has not only merited, it has commanded success. Long may it flourish!

The greatest industry of all is Agriculture. In the fascinating problems of plant breeding (in order to improve the quality and increase the yield of foods, fibres, oils, etc), there is endless scope for the better educated men and women of the rising generation. The continued

improvement of Agricultural machinery is another direction in which the educated classes can find opportunities for contributing materially.

Indian Manufactures come next. Here INDUSTRY has for many years afforded a most valuable stimulus. That the maximum benefit to all concerned may result, I would urge that Indian industries, present and future, should place their reliance on Science, Energy, and Sustained Effort rather than on the fickle crutches of Government support in the form of import Tariffs and other artificial and uncertain aids.

Problems of Communication and Transport must not be overlooked. These problems afford great opportunities for inventive minds. For not only have land, river, and sea to be studied, but now-a-days the air also in its lower, middle, and upper strata. In electricity, in the various fuels, and different types of prime movers available, and possible, problems without end are awaiting solution,—problems of the greatest interest and attraction for men of education.

To conclude, let me add that profitable production and successful industry are the root sources,—indeed, the only sources,—from which can be won the profits or surpluses that support the whole social structure (including the machinery of Government in all Departments), and which render progress and higher civilisation possible. Production, industry, and trade are therefore essentially higher in essence and nobler in character than any Government job. Let us therefore devote our best thoughts and energies to production, manufacture, and trade. And may INDUSTRY continue to give that valuable aid to each and all in the future which it has so freely and successfully afforded in the past."



Raja Bhupendra Narayan Sinha Bahadur of
Nashipur.

NEED FOR INDUSTRIAL DEVELOPMENT.

RAJA BHUPENDRA NARAYAN SINHA Bahadur of Nashipur, MLC. Ex-Minister to the Government of Bengal writes:—

"INDUSTRY is becoming more and more important in the modern world, especially, in India, where there is great scope and tremendous field for industrial improvement. INDUSTRY renders valuable service to the industrial world and assists all those who transact business to equip themselves with necessary information and knowledge. During the last 25 years it has helped people who desire an industrial pursuit in solving the great problem of unemployment to a certain extent. I wish it every success in future."

SOLUTION OF INDIA'S ECONOMIC PROBLEM.

DR. P. BANERJEE, M.L.A., Lately Minto Professor of Economics, Calcutta writes:—

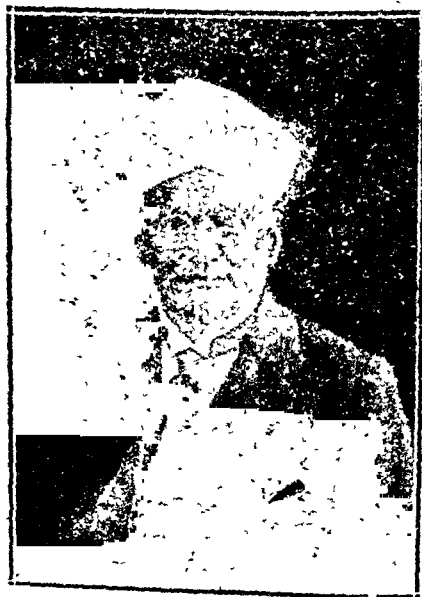
"I offer my hearty felicitations to the Editor of INDUSTRY on the occasion of the completion of the twenty-fifth year of the journal. This journal is devoted to the discussion and elucidation of important problems relating to the trade and

industry of India, and it has rendered valuable services to causes of the economic development of the country. I wish it a future career of even greater usefulness than its past and hope that INDUSTRY will be able to render still more valuable services in the days to come."

A HANDBOOK OF PRACTICAL KNOWLEDGE.

HON'BLE MR. G. A. NATESAN, Editor, Indian Review, Member of Council of State writes:—

"You have made INDUSTRY a journal of practical use for the layman as well as the industrialist: and from the very large demand for literature of this kind I am sure INDUSTRY is making headway and is rapidly becoming what I may call a handbook of practical knowledge for the public. In these days of unemployment and depression in particular, your enterprise deserves all the success it has achieved. I wish INDUSTRY a long and prosperous career in the service of the nation."



Hon'ble Mr. G. A. Natesan.



Prof. Benoy Kumar Sarkar.

SERVE THE INTERESTS OF TECHNOLOGY AND ECONOMICS.

PROF. BENOY KUMAR SARKAR, Calcutta University, Calcutta writes:—

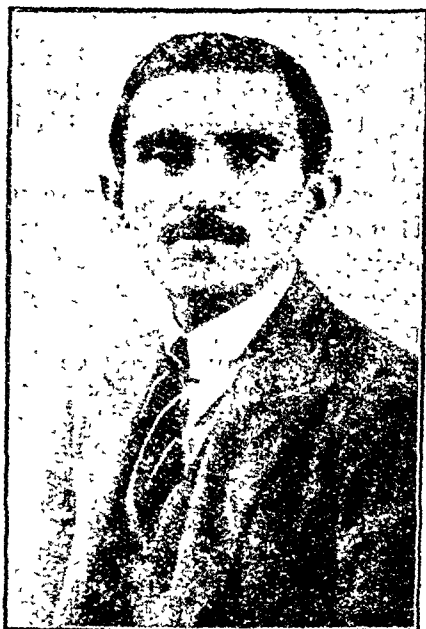
"The last quarter of a century is signalized by the slow but steady development of industrialism and technocracy among the diverse sections of the Indian people. Those who have watched this happy consummation are aware how systematically the monthly INDUSTRY has striven to promote the intellectual atmosphere adapted to the remaking of India's economic structure. It gives me pleasure to be able to say that while lecturing at American Universities and at the Universities of Paris, Berlin, Geneva, Rome, Milan, Munich, etc. it was possible for me to refer to the pages of this journal as a document of comparative capitalism from the viewpoint of economic India. It is to be trusted that

in future also INDUSTRY will know how to serve the interests of technology and economics according to the higher and more complicated requirements of the age upon which we are now entering."

DISSEMINATION OF INDUSTRIAL INFORMATION.

MR. CHUNILAL B. MEHTA, Bombay writes:—

"I have followed with great interest the progress of INDUSTRY and the valuable work it has been doing for the past several years in the promotion of small industries in India. Its comprehensive and detailed information on these topics should have helped many a young man to set up in life independently. Its correspondence columns give ample proof of this feature of its activities. There have always been some very interesting articles on subjects relating to Indian industrial development and in these days when the economic reorganisation of the coun-



Mr. Chunilal B. Mehta.

try is attracting so much public attention, these serve a very valuable purpose.

The problem of unemployment which has always been an extremely acute one in this country has come more into greater prominence owing to the emergence of the new class of educated unemployed. Among the many remedies that have been suggested, two ideas that appear more hopeful than others are a policy of returning to the land and a steady growth of industrialisation in the country. The pioneer work in the latter direction which INDUSTRY has been doing all these years is now bearing fruit in our industrial activities and I wish the journal continued progress and hope it will be of an ever-increasing service in the cause of the expansion of Indian industries."

AGRICULTURE AND INDUSTRY.

MR. BRAJENDRA KISHORE ROY
CHOWDHURY, Zamindar, Gauripur, Mymensingh
writes:—

"India is a mainly agricultural country. Over ninety per cent of her population live directly and indirectly on agricultural trade and industry. For our very existence we must improve and develop our agriculture and agricultural industry. Agriculture itself cannot thrive without the aid of industry. In a poor country like ours the most suitable form of industry is cottage industry which does not require much capital but organisation, will, knowledge and skill. The INDUSTRY has been educating us in this behalf for the last twenty-five years and has been able to point out new openings and find useful occupations for many of our unemployed youths. May Providence bless her for this end, grant her a happy and prosperous lease of life—and allow her to fulfil her high mission."



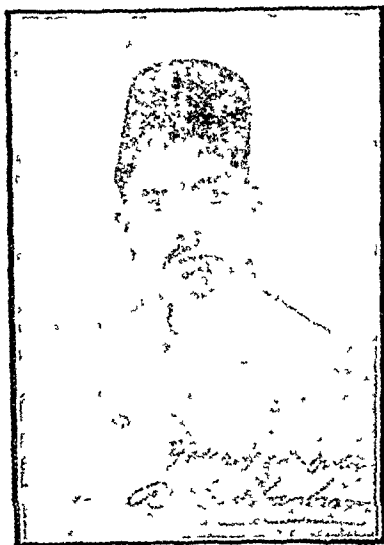
Mr. Tushar Kanti Ghosh.

GOVERNMENT'S PART IN DEVELOPING INDUSTRIES.

MR. TUSHAR KANTI GHOSH, Editor, *Amrita Bazar Patrika*, Calcutta writes:—

"I am highly pleased to learn that INDUSTRY is going to complete 25 years of its very useful existence. The journal has been rendering an invaluable service towards the growth and development of commerce and industry in this country. One of the most important features lies in the practical suggestions it contains for starting home industries with small capital.

When both the people and the Government of this country are busily engaged in the development of cottage and smaller industries, I fully trust, your Jubilee number will receive immense appreciation."



Mr. Abdul Gani Hasham.

DEVELOPMENT OF UNEXPLOITED RESOURCES

MR ABDUL GANI HASHAM, President, The Memon Chamber of Commerce, Bombay writes.—

"I heartily congratulate you on the occasion of celebration of Silver Jubilee of your Magazine which has completed 25 years of brilliant career, and earnestly hope that it may continue to serve the Indian commercial and industrial public for many more years to come and celebrate Golden and Diamond Jubilees

I have no hesitation in saying that your Magazine furnishes most valuable and useful information for industrial pursuits, and during its short career it has acquired good status, popularity and immense reputation. India is an agricultural country having her large resources still fully undeveloped I believe that development of her resources on scientific basis will mitigate unemployment, increase industry, and thus will solve the problem of bread and butter of our hundreds of poor countrymen who are struggling hard for very existence and on whose wellbeing largely depends the prosperity of the society. I am confident that my Memon Community will not lack

behind in co-operation with organisations specially interested in developing Indian Industries."

ONLY WAY TO SALVATION.

CAPTAIN J. W. PETAVEL RE, Poona writes:—

"India has Japan showing her the only way of salvation for a country whose population has become too dense for peasant cultivation to support it. Publications like INDUSTRY that are calling upon young India to follow the lead are rendering the greatest national service."

INDUSTRIAL REGENERATION OF INDIA.

MR M. P. GANDHI, SECRETARY, Indian Chamber of Commerce, Calcutta writes:—

"I have watched with great satisfaction the activities of your Journal in the field of commerce and industry. I have no hesitation in saying that your Journal takes a high rank among the Journals devoted to the development of Commerce and Industries in India. I feel that you have done a great service in respect of industrial regeneration of India by your ceaseless efforts in keeping before the public eye the possibility of development of numerous industries from time to time. I wish you and your Journal a bright career of still greater services to the country."



Mr M. P. Gandhi.



Mr. Amar Nath Dutt.

PROSPERITY FOR THE FUTURE.

MR. AMAR NATH DUTT, B.L., Ex-M.L.A.,

Advocate, Burdwan writes:—

"The magazine has supplied a long felt want and has been instrumental in inducing many of our youngmen, to take to industrial pursuits, which is the need of the hour.

I wish INDUSTRY all success and prosperity for the future and hope it will be instrumental in relieving the present economic distress to a great extent and unemployment among our countrymen."

DEVELOP SMALL INDUSTRIES.

DR. S. C. Roy of the New India Assurance Co Ltd., Calcutta writes:—

"Commercial journalism in our country is still in its infancy and there are very few successful journals in the line in this country. The position of your journal is unique in respect of circulation. In these hard times your articles on small industries are specially attractive and very useful to our youngmen in the selection of a career. I again wish it success in its future years."

INDUSTRIALISATION OF INDIA.

MR. S LALL, I.C.S., Director of Industries, Bihar & Orissa writes:—

INDUSTRY a magazine for businessmen and industrialists has now been in existence for twenty five years. Many of its articles have been both interesting and useful. The need for the development of Indian industries is strongly felt

and INDUSTRY should play an important part in making educated Indians 'industrially minded.'"

CO-ORDINATION OF TECHNOLOGY WITH ECONOMICS

LALA SHRI RAM, The Delhi Cloth & General Mills Co., Ltd., Delhi writes:—

"I must congratulate you on the completion of a very successful record of service for a quarter century by INDUSTRY. I have been an occasional reader of your paper and was impressed with the chief feature of your journal viz., co-ordinating the technical aspects of the different industries with their purely business and the wider economic aspects; for I have found that besides supplying the usual statistical and other trade information, it contains instructive articles on the technique of the various industries. I wish the journal, on the eve of its Silver Jubilee, a yet more successful record of service."

THE IDEAL BEFORE INDIA.

MR. L. C. JAIN, D.Sc., ECON., (London), University Professor of Economics, Punjab University, Lahore writes:—

"As its very name indicates, during the last 25 years the INDUSTRY has stood out as a great ideal for all young men and workers in the country. Both in its articles and in its views, it has set for itself a high standard, and I can wish no better than that the INDUSTRY may continue to excel its record of usefulness year after year."

CRY FOR INDUSTRIAL MAGAZINE.

MR. KASTURBHAI LALBHAI, Ahmedabad writes:—

"In an industrial country like India, which is one of the eight foremost industrially advanced countries in the world, the need for industrial magazines cannot be doubted. Amongst the few technical and industrial magazines that enjoy the confidence of the public, INDUSTRY deserves a recognised place and the very fact that it had a continued 25 years successful publication, proves its utility and popularity. I wish it a continued success."

MOST USEFUL PERIODICAL.

SIR LAL GOPAL MUKHERJEE, Kt. Late Chief Justice, Allahabad High Court, Allahabad writes:—

"I have seen a copy of the magazine INDUSTRY. It is a most useful periodical and now, when want of employment is so wide-spread in the country, its usefulness can not be exaggerated. I wish it God-speed. May it continue long in its career of usefulness."

NEED FOR CAPITAL AND ENTERPRISE.

MR. MANU SUBEDAR, President, Indian Merchant's Chamber, Bombay writes:—

"I am a firm believer that, for the growing deterioration of the condition of the masses, for more widespread and acute poverty than we have ever known before, and for unexampled unemployment amongst the middle classes, there is no remedy except the expansion of industry. Such expansion cannot be brought about except with capital and enterprise, but also it cannot thrive except in an atmosphere of industrial enthusiasm and knowledge. It is the latter purpose, which, I believe, your Magazine advances in a remarkable degree. I, therefore, wish you all success"

IMPULSE FOR INDUSTRIAL CAREER.

MR. A. B. PANDYA, The Director of Commerce, Industries & Labour, Baroda writes:—

"During its 25 years of existence INDUSTRY has in no small measure contributed towards industrial advancement of India especially in the field of small industries. It has made many of our young men industrially minded and has given them in many cases the first impulse towards—an industrial career.

I consider the role played by INDUSTRY as worthy of high praise and wish it a long life of continued and greater usefulness."



MR. A. B. Pandya.

INTERESTING FOR TECHNICISTS AND LAYMEN.

MR. P. B. ADVANI, Director of Industries, Bombay writes:—

"The journal gives general description of the working of small industries established in India and abroad. It is interesting both for technical people and laymen and contains very useful information. Your annual publication also is a comprehensive directory of small and large industries established in India. I am glad to state that both the publications—the journal and the directory—serve a very useful purpose."

AN APPRECIATION.

THE DIRECTOR OF INDUSTRIES, Punjab writes:—

"INDUSTRY is a useful magazine which has been generally appreciated."

Our University & the Industrial Uplift.

[By SIR DEVA PRASAD SARVADHIKARI, LL. B. V. Chancellor, Calcutta University]

66 **I**T is no mean a testimony, of the competency, efficiency and usefulness of an Indian conducted Calcutta Monthly to be in existence for quarter of a century, is all the more notable and striking when the publication is of a mixed and general character appealing equally to the expert as to the lay public, such a certificate has been worthily won by the INDUSTRY under the capable conduct of Mr. K. M. Banerjee. The Journal will be celebrating its Silver Jubilee in the year of grace that sees the auspicious celebrations of the Silver Jubilee of His Gracious Majesty King Emperor George V. His Imperial Majesty has been a declared and devoted friend of all industrial, agricultural and commercial ventures that stand for the solidarity and stability for His far flung Dominions. When the disastrous War broke out and all were reduced to abnormal pinch, King George true to the classical significance of His honoured name set a memorable object lesson in agricultural and industrial developments without which His country, His people and His Empire could not possibly be saved in that awesome crisis. He set an example which was immediately copied in Imperial, public and personal concerns. This related not only to mere trifles like cutting down his own allowance of sugar and drinks, in taking off his coat, tucking up his shirt sleeves and taking a ready, willing and real hand in potatoe culture in the Buckingham Palace grounds in full public view and gaze with gates thrown open but also to every important detail of national industrial life.



Sir Deva Prasad Sarvadhikari.

His people readily, willingly and worthily seconded Him all round and the Throne and Crown of England not only survived but rose resplendant amidst the universal wreckage of Central and Eastern Europe. The key-note of this great work of rescue and salvage was not only the constitutional wisdom of this Sovereign and Legislature, not only the sagacity of the Minister and the dogged determination of the fighting machinery, not only the loyal and willing co-operation of all Members of the Empire and the Commonwealth—most of the Indian Partner—now admitted as such, but the solid high character, devotion and sacrifice of the King and the Queen and the Royal Family.

His Imperial Majesty's inspiring and thrilling message of hope and confidence to the University of Calcutta when He was in our midst still fresh in our me-

mory was a great lever in our educational and industrial movement. When His Majesty's Viceroy honoured me with a call to the Vice-Chancellor's Office in 1914, I did my humble best to interpret and give effect to His Majesty's message. In my first Convocation Address to the University presided over by Lord Hardinge I said:—"I long for days when we may have a Faculty of Commerce and Industries to assist us in solving problems of material prosperity with the aid of advanced scientific and economic ideas, for propagation of which some provision has already been made. The question of enabling our graduates to earn their livelihood must engage our attention as it is doing in other Universities."

In my second Convocation Address in 1916 I said:—"The time is fast approaching, if it has not indeed come, when the University must assist in the economic development of the country and in the fostering of the material prosperity. Properly equipped establishments teaching the principles of these subjects will soon be some of the most important parts of all up-to-date Universities. We cannot for all time continue to be a poor imitation of the earlier Universities of the West and give the go-by to modern ideas that are elsewhere prevailing with advantage."

"Great impetus to the advance of this idea was given by His Excellency the Viceroy when he charged his Benares audience not to let their ambitions be satisfied with merely having a chair of Technology, (which the munificence of an Indian Prince has fittingly endowed in Lord Hardinge's name), but should steadily keep before them the aid of creating colleges or departments of Agriculture and Commerce among other things so that the University may be 'a place of many-sided activities prepared to equip the young for all the various walks in life that go to the constitution of modern society, able to lead their countrymen in the path of progress, skilled to achieve new conquest in realms of science, arts, industry and social well-being and armed with the knowledge, as well as the character, so essential for the

development of the abundant natural resources of India.' The thoughts, hopes and aspirations that these words roused in my mind on the banks of the ever inspiring holy river on that memorable day came back to me with renewed vigour, when His Excellency was opening the Commercial Museum in this city and bore eloquent and willing testimony to the number and quality of many articles manufactured in Bengal and entirely unknown to His Excellency. It cannot be denied that a broad-winning education as some sneeringly call it, is necessary for many. But everything learnt as a preparation for taking part in the commercial or economic battle of life need not be absolutely or necessarily divorced from culture. Culture need not be the monopoly of a few isolated detached and select minds and the time ought not to be long in coming when serious men, working together in the service of a purified culture, may be directors of a system of instruction calculated to promote that culture. Changing conditions, that will be still further changed at the close of the world-strike, must also bring about change in our ideas if pace is to be kept with the times. Bombay which had its Faculty of Commerce before, have just decided also on a Faculty of Agriculture and Benares may soon have hers. How long will Bengal, rich in agricultural resources and not very backward in commerce and industry, lag behind?"

In my third Convocation Address in 1917 I said:—"It is one of our acute disappointments that so few of our University men have any share in the larger operations of commerce and industry that go to the development of the resources of the country. This causes peculiar anxiety, because the paths chosen by the bulk of our graduates are in a state of chronic overcrowding . . . The latest report of the Indian Students' Department in England, the local committees of which are about to be reorganised, says.—'It may well be that the only permanent solution of the student problems lies in building up in Indian Universities, industries and institutions adequate to give her sons all the train-

ing they require But that day is yet far off.' It need not and ought not to be far off, if the solution suggested by the Department is the right one. To assist those who come to seek knowledge and come not merely for its sake, those to whom the problem of livelihood is a stern reality, it is our growing duty to make all possible arrangements without sacrificing our rude ideas. We would place these men in positions in life from where what they have acquired at the University can bear good fruits in social service and loyal citizenship and we would make the Universities less open to criticism about the unpractical character of its work. We have often a silent and sometimes an audible challenge thrown out that Bengalis are incapable of independent and successful direction of commerce and industry, as evidenced probably by the growing economic distress of the 'Bhadralog' classes, that has social and political reactions of an undesirable character. We have to realise and preach the dignity of labour, from the lowest rung of the ladder and make it clear that the Lord who appreciates the chanting of His name also wills that the hands that His wisdom and benevolence provided should at the same time do their work. And with some effort this should be possibly in a country in which service of man is really and truly the highest cult and where the privilege to sweep the Lord's Temple has been considered the greatest honour of a mighty Prince."

In 1918 I insisted in the Convocation Address of that year on promotion of Commercial, Technical and Agricultural Studies with no mean vigour.

This has been my motto and guiding spirit in public life throughout and I have tried in many directions and concerns to identify myself with the industrial uplift of my Country and to the advancement of the causes of Insurance and Co-operation without which there can be no salvation to the Country in the "Spacious Days" ahead. They must proceed hand in hand with culture and education, their trusted, valued and essential handmaidens.

Any one that lends a willing hand however humble, in such a worthy enterprise does worthy homage to the Divine Mother and deserves well of the country and the people. Such a title has been won by those presiding over the destinies of the INDUSTRY. They claim that "during the last 25 years of its useful career it has induced many a young man to take up industrial activities who are pursuing the indicated lines with success." They also claim that "during the last 25 years it has attained a regular circulation of 20,000 copies all over the country and its readers are a class of progressive wide-awake people. They hope that its Jubilee messages will instil enthusiasm in these young men for better work in small industrial fields inducing others to come with them. Unemployment is scarce among readers of INDUSTRY and its message inspires all classes of people to productive activity."

This is no mean a title to public recognition and support. I willingly and prayerfully give the message of good will and blessing which the conductors of the journal seek on this occasion and fervently share their hope that it will add to the strength of those that come within the charmed circle of its inspiration. May the utility of the Journal grow from more to more in the years to come.

Those who are seeking to put India on the high though difficult road of responsible Government leading to Dominion Status are animated with similar desire. Of these the Labour Leader, Mr. George Lansbury, in his striking contribution to the discussions on the India Reforms' Bill says:—"That the idea that it is a good thing for the British to manage their own fiscal affairs and not for the 300,000,000 of Indians to manage their industries in their best interests of their own people is not tenable."

In this great national work ahead assured by the British Labour Leader INDUSTRY has an assured part and all interested in the Country's uplift must wish and do with it God-speed."

Unemployment—Right Remedies & False.

[By MR. MRINAL KANTI BOSE.]

THE responsibility for creating employment largely rests on Governments to-day. The reason is not far to seek. The problems of a civilized population are far too complex, particularly in these days of international trade and commerce, to be dealt with by individuals or even by powerful non-official associations. Government can take action far more quickly and effectively than anybody else. It can command and mobilise the resources of the State and are therefore in a position to produce results in years that would take decades for the scattered forces of the people, even when locally organised, to accomplish. All Governments in the West and some of the East, of Japan in particular, have therefore undertaken the responsibility of organising, controlling and marshalling the national resources in such a manner as to create employment for as many people as possible. Tariff protection, banking organization, exchange policy have a very close connection with industrial and agricultural life and therefore with employment. Government's policies in regard to these and similar other matters should therefore be inspired by an undivided desire for the welfare of the nation. No Government can properly do its duty in regard to these vitally important matters that has to consult not only the welfare of the people directly under its charge but also of another people. The Government of India, as at present constituted, is in the unhappy position that it can not initiate policies and pursue measures solely with an eye to the

needs and requirements of the people of India. India's economic problem therefore cannot be considered apart from her political position. The Government of India must be a national Government before one can expect to see the face of India changed in a measurable time as it has been possible for the Government of Japan to change the face of that country within the brief period of a quarter of a century, or as it has been possible for the Soviet Government to do in Russia.

It will not however do for us to sit idle till the constitution of the Indian Government has so changed that we may call it our national Government. The immensity of the task before us may well quail the stoutest heart. The appalling illiteracy (92 p.c. of the population are illiterate) has created and stabilised a condition of inertness that has been the despair of the most earnest workers among us. In Russia they have begun as their very first endeavour to clear the jungle of illiteracy. It has been found by experience that the ordinary method of removing illiteracy by the establishment of elementary schools is a very slow process. Far quicker results, and by no means evanescent, are obtained by the adoption of the modern scientific methods of spreading useful knowledge by means of the radio, lantern slides, cinema, etc. Knowledge in every subject—health, sanitation, agriculture, home industry, marketing organisation—can be conveyed by means of these channels to the rural population. I give the first place to knowledge. Ac-

tion must follow knowledge. And it is a mistake to suppose that economic recovery for the rural population can be brought about by agencies imported from outside. Individual effort must come from the realisation of inner strength. And without knowledge strength cannot come.

I would therefore suggest that a plan similar to the one sketched below should be adopted for the diffusion of knowledge among the rural population:—

(1) The establishment of a bureau of information at the head-quarters of each district. The bureau is to consist of officials and non-officials and should have a collection of useful tracts, lantern slides, and other demonstrative equipments in a local public hall, e.g. Library or Town Hall. The bureau should maintain itself by the sale of books, simple and inexpensive machinery—agricultural and industrial,—and such useful things as tube-wells, etc., that have a ready sale in the district. The bureau should be registered as a Joint Stock Company and a few energetic and honest youngmen should be placed in charge of it on a small remuneration to begin with. The bureau should not only be a centre for the diffusion of information, but also for the supply of such materials of a non-perishable character that may be of use to those who will seek to utilise the information supplied by the bureau for the practical purpose of earning a livelihood. The bureau may receive grant-in-aid from Government, District Board, Municipality and other public bodies; but all such grants are to be capitalised. The expansion of the stock and of the activi-

ties of the bureau are to be regulated by the success it achieves in running on commercial lines. No public subscriptions are to be sought and no begging in any shape or form on behalf of the bureau is to be allowed.

(2) Each district, the head-quarters of which have a bureau of information, should be divided into groups of suitable villages. The subdivisional town may be a sub-centre having a bureau of information similar to the one in the district town. Not all villages will be suitable for organisation at the very start. Generally speaking, village groups that have a co-operative credit society are sufficiently advanced to be suitable fields for the diffusion of knowledge. The subdivisional town and the most important village in a group of villages that has been able to organise a co-operative credit society may, to begin with, be the suitable units for the organisation of a bureau of information run on the same lines as the bureau in the district town. These units should be autonomous as far as possible, except that arrangement should be made for interchange of workers and for mutual advice and assistance. As the bureaus will be registered as Joint Stock Companies, audit of accounts should be done in the usual way. The greatest scope should be given for local initiative, local effort and every encouragement should be given to cultivate the habit of independent thinking and of independent action.

(3) These bureaus of information should be in close touch with the Industrial Department and Agricultural Department of the provincial Government and should not hesitate to ask for advice

and assistance, whenever necessary. Self-help-however should be their motto and guiding principle.

Much has been written on the general remedies for unemployment. Sir M. Visveswaraya in his book "Unemployment in India, its causes and cure," has very ably discussed them. I do not propose to tread on grounds covered by him. I agree with him that land can no longer possibly support the growing population of India, and the problem before us is one of "industrialisation" of the whole country. That does not mean that there should be a network of big industries. There is in about every village scope for the organisation of what are called home industries not only for the artisan class but also for agriculturists who are condemned to enforced idleness for at least six months in the year. The study of the mentality of villagers has convinced me that the best of intentions and the best of plans for the revival of home industries will not succeed unless the inspiration, the motive, has come from the villagers themselves. The motive of action is to be supplied by knowledge, and I have given a plan as to the best and practicable means of the diffusion of knowledge.

It has been said, and Sir M. Visveswaraya seems to be inclined to that view,

that the problem of unemployment of the educated middle class is different from that of the artisan and agricultural classes. I do not agree. Unless there is economic uplift from the bottom, the higher classes cannot possibly find employment, except in the professions and the services which admittedly are overcrowded. The educated youth will have to seek his fortune in the scheme of rural economic development. He may produce wares in his small factory, but these will have to be sold to rural consumers because of the cut throat competition in the towns and cities. He will have to identify himself both as a producer and a consumer with the village population. The task that will find employment for him and honourable position too, is the one connected with village improvement schemes. The upper and the lower middle classes—lawyers, doctors, traders,—are in the grip of severe economic distress because of the low condition of the rural population whose purchasing power has very considerably declined. The latter cannot buy services nor goods.

The problem of unemployment therefore is a problem not of the educated middle class, but really of the rural population. Our efforts should therefore be directed towards improving the condition of the latter.

A Quarter Century Progress in Industries.

[By MR. M. P. GANDHI.]

IT CANNOT be disputed that there has been a remarkable development of industries in India during the last quarter of a century, and particularly after the year 1919. The need for industrialisation of the country also cannot be disputed because the vast mass of India's population, depending for their livelihood solely on agriculture, the earnings from which are precarious, depending as they do on ill-regulated rainfall, etc., badly requires some additional or alternative source of income. India possesses many industrial advantages such as abundant supply of raw material, cheap and contented labour force, a large home market for various goods. For a very long time the Government in this country had a policy which tended to exporting raw products, although the people repeatedly pressed upon the Government the imperative need for adopting a rapid policy of development of industries in the country. The recommendations of the Indian Industrial Commission of 1916 and the Indian Fiscal Commission of 1921 brought home to the Government that industrial development in India had not been commensurate with the vast area and population of the country and its natural resources. As a result of their findings, the Government decided in 1923 to change their fiscal policy from one of *laissez-faire* to that of discriminating protection and this is no doubt an important landmark in the history of India's industrial development. The adopting of such a protective system has been largely responsible for the growth and development of several industries in the country, and has conclusively proved the wisdom of such a course. The progress achieved by some of these protected industries like Cotton Textile, Sugar, etc., has been phenomenal and has fully justified the expectations of

both the Government and the people by effectively checking the inflow of foreign goods, by affording employment to a large number of the population and by utilising to a large extent the raw materials produced in this country. The policy of discriminating protection has also indirectly helped the development of subsidiary industries in the country. Thus while forming an estimate of our industrial status in the comity of Nations, we may very well say that, though we cannot in any sense be ranked as a first class industrial power, we can legitimately claim to have advanced a little from where we were a quarter of a century ago. This does not at all imply that India has cause for satisfaction with her achievements, but on the other hand her success so far in her industrial experiments should further encourage her to adopt a bold and well-planned economic policy of expansion of industries suited to her genius and environments, in common with other nations of the world.

Let us now make a rapid survey of the various industries existing in India to-day.

COTTON MILL INDUSTRY.

At the beginning of this century there were about 200 cotton mills in India, which increased to 233 in the year 1914-15, and to 266 in the year 1931-32. In 1914-15 there were about 97,000 looms and 6 million spindles while in 1931-32 the corresponding figures have increased to 154,000 looms and 8 million spindles. The total cotton crop production in India is estimated at about 5 million tons of which Indian Mills (British India) alone consume approximately 2 million bales (400 lbs. each). The following table gives the production figures of Indian Mills for varying periods during the last

quarter of a century, together with the quantity of imported cotton piecegoods.

Period.	No. of Mills	Production of		Import of piece-goods in million yds
		Yarn in million lbs.	All kinds of goods in million yds	
1914-15	233	612	1,291	2,416
1919-20	235	597	1,778	1,081
1924-25	255	661	1,825	1,823
1929-30	256	731	2,423	919
1931-32	266	848	2,663	766
1932-33		886	2,785	1,225
1933-34		797	2,553	796

From the table given above, it will be seen that while the production of Indian Mill made cloth has steadily increased, imports from foreign countries have dwindled. The total consumption of cotton piecegoods in India on a *per capita* consumption basis of 14.17 yds. amounts to approximately 5,000 million yds. of which Indian mills produce about 2,500 million yards and the handlooms produce about 1,436 million yards. With their present equipment, Indian mills and handlooms can easily supply the full requirements of cotton piecegoods in India. (Vide Author's "How to Compete with Foreign Cloth, The Indian Cotton Textile Industry—its Past, Present and Future.")

It is hoped that the Government will take necessary measures to ensure the development of this greatest national industry, with a view to be self-sufficient in the matter of supply of our requirements of clothing.

JUTE INDUSTRY.

India, or more appropriately Bengal has practically a monopoly of jute production in the whole world. For a very long time jute manufacturing was confined to merely handspinning and handweaving and it was in a most flourishing condition till about the middle of the last century. The first jute mill in Bengal was started in 1855 and the first power loom introduced in 1859. While in the year preceding the World War, there were about 60 mills in India, to-day there are 98 mills in India with 62,000 looms (of these over 90 mills with 60,000 looms are in Bengal). The consumption of jute in the Indian Jute Mills was about 42 lakhs of bales in 1933-34, when the total crop was about 80 lakhs of bales.

A study of the following table will give an idea of the progress achieved by the Indian Jute Industry during the past quarter of a century:—

Raw Jute Production & Consumption In Bales of 400 lbs. each.		
Period.	Production	Consumption in Indian mills
1910-11	7,932,000	3,980,000
1915-16	7,340,000	5,770,000
1920-21	5,915,000	5,623,000
1925-26	8,940,000	5,497,000
1930-31	11,205,000	4,564,000
1931-32	5,542,000	4,269,000
1932-33	7,072,000	4,245,000
1933-34	8,012,000	4,192,000
1934-35	7,963,000	

The total production of all manufactured goods by the Indian Jute Mills has also increased as can be seen from the following figures. (These figures were not compiled before 1930). In the year 1931 the total quantity of goods manufactured was 7,77,884 tons, in 1932, 7,99,141 tons, in 1933, 8,34,850 tons and in 1934, 8,39,094 tons.

During the last four years, the demand for jute and jute manufactures both in India and abroad has shrunk considerably to Trade Depression. With a view to maintain an equilibrium between the restricted world demand of jute and its huge supply, the Government of Bengal have launched upon an intensive programme of voluntary restriction of jute crop. The Government's aim is to curtail the supply for the purpose of raising the price of jute from its present low and unremunerative level. There are bright hopes for the successful materialisation of the scheme launched into existence by His Excellency, the Governor of Bengal, Sir John Anderson, with the full concurrence of the Minister-in-Charge and the Members of the Executive Council and other officials of the Government. If this hope materialises, there will be a substantial rise in the price of jute which will doubtless bring about an improvement in the economic condition of the people.

THE IRON AND STEEL INDUSTRY.

For the industrial development of a country, Iron and Coal are valuable and India is fortunate in having iron ore deposits in a large range in the province

of Behar and Orissa and the adjoining States. The iron ore in India is very rich and contains on an average about 60% of iron to every ton of ore mined. Indian pig iron and iron ore are exported to almost all countries of the world, and Japan is the principal market for exportation of pig iron from India. There are four principal concerns in India engaged in the Iron and Steel Industry. Of these the plant of the Tata Iron & Steel Co., at Jamshedpur is the largest. It is estimated that the total number of workers employed in the industry comes to about one lakh and the total tonnage of iron consumed in India is 100,000 tons per annum. The Iron and Steel Industry in India received tariff protection in 1927 for a period of seven years and it was only last year that the Legislature passed another Act extending the period of protection to a further period of seven years. The production of iron ore in India has increased from year to year; while in 1914 the total quantity of iron ore produced was only 192,000 tons, it has risen to 1,408,000 tons in the year 1931. The production of pig iron, steel ingots and finished steel during the past few years are given in the following table:—

	1929-30	1930-31	1931-32	1932-33	1933-34
	Quantity in Thousands of Tons.				
Production of Pig Iron	1,349	1,164	1,080	880	1,109
Steel (Ingots)	624	580	603	591	721
Finished Steel	431	408	451	442	551

The import of iron and steel manufactures from abroad has also dwindled from 1,018,000 tons. being the Pre-War average, to 614,000 tons in 1930-31 and to 329,000 tons in 1933-34. Thus we see that the Indian Iron and Steel Industry, one of the basic industries in India, is steadily expanding and there is every reason to hope that it will prove a great national asset helping many subsidiary industries such as Tin-plate, Fabricated Steel, Wire and Wire-Nail Products, etc.

COAL INDUSTRY.

The Coal Industry is as important as Iron and Steel Industry inasmuch as it helps the industrial advancement of a

country to a great extent. The chief coal fields in India are situated in Bengal, Behar and Orissa and to a certain extent in the Central Provinces. The annual production of coal in India averages to 20 million tons as against the total world production of 1,250 million tons. The most widely-used and superior coal in India comes from Raneegeunge and Jharia, two of the principal Mining Centres and they supply a major portion of their output to Railways and many industrial concerns. The output of coal in India has gone ahead steadily with the increasing industrialisation of India as can be seen from the following table:—

Year.	Quantity in 1,000 tons.
1910	12,017
1915	16,360
1920	17,092
1925	19,989
1930	22,762
1931	20,694
1932	20,000 (Approx.)
1933	19,000 "

From the above it will be seen that the production of coal in India reached the peak in 1930 since when there is a tendency to decrease, due to the prevalent depression. The freight policy adopted by the Railways in India prevents Bengal coal from successfully competing with foreign coal (South African) in the Western Coast, inasmuch the latter is comparatively cheaper than indigenous coal. The consumption of coal in India in 1933 was about 19.4 million tons. The chief consumers are the Railways, which consumed about 6.4 million tons in 1932-33 and 6.6 million tons in 1933-34. Coal, which is a key industry, affecting the welfare of a large number of industries and consumers in general, is at present in the grip of a severe depression. The price of coal has gone down to a very low level, and the industry is devising measures for its uplift. It is the duty of the Government to render necessary help to the industry in its hour of need.

SUGAR INDUSTRY.

If there is any industry in India which has amply justified the protection granted to the industry, it is the Indian Sugar Industry which has during the past

two years made a heavy expansion. The Sugar Industry Protection Act was passed in April 1932. The unique success of protection can be seen from the fact that over 100 factories of an average cane-crushing capacity of 600 tons per day were established within two years of the grant of protection, and to-day there are over 150 sugar factories in India producing over 8 lakhs tons of sugar per annum. Even the Government would not have expected that a stage would be reached, within only 3 years of the grant of protection when the industry would be in a position to supply practically the full requirements of the country for sugar. The industry is concentrated in United Provinces and Behar which together produce more than half the quantity of sugar produced (409,00 tons) in India. The acreage under sugar-cane has also considerably increased. While in 1929-30 the area under sugar-cane was about 2,677,000 acres, it has increased to 3,321,000 acres in 1932-33 and to 3,305,000 acres in 1933-34. The following table will illustrate how production of sugar in India has been enormously increasing during recent years and how the imports of sugar have been consequently decreasing:—

Year	Production of sugar in India in tons,	Imports of sugar in India in tons,
1929-30	89,768	932,276
1930-31	119,859	897,896
1931-32	158,581	511,319
1932-33	290,177	365,707
1933-34	453,965	261,299

It will be seen from the above that since the grant of protection in 1932, the industry has nearly reached a stage when she can supply fully the requirements of the country without depending on foreign supplies.

OTHER IMPORTANT INDUSTRIES.

A survey of some of the important industries in India given above by no means exhausts the list, for there are industries like Tea, Salt, Paper, Matches, Engineering and Building, Cement, etc., in which a large amount of capital has been sunk and a considerable number of workers are employed. In each of them India has been progressing steadily. The Tea Industry is at present working under

a World Tea Restriction Scheme, as the supply has outstripped demand throughout the world; and industries like Paper, Match, and Salt are showing signs of healthy growth and are steadily displacing foreign goods. In India there are many middle-sized industries, such as Paint and Varnish, Toilet, Soap and Perfumery, Chemicals, Shoe-making and Tanning, Hosiery, all of them greatly contributing to the welfare of this country. These middle-sized and small industries have of late been growing at a fast pace in India and are relieving the problem of unemployment for a large number of educated youths in the country. The Government, of late, have also adopted various measures for encouraging the revival of various small industries in the country by making provision for imparting technical knowledge in suitable centres, by opening exhibitions, by making suitable grants, by convening industrial conferences, by forming a bureau of industrial intelligence and research, by making monetary grants, etc. The Stores Purchase Department of the Government, (though much more can be done by it) is also encouraging the growth of industries in India.

COTTAGE INDUSTRIES.

An industrial survey in India will not be complete without examining the state of Cottage Industries in India. Their importance to the millions of India is immense since they afford alternative sources of employment for the predominantly large agricultural population in this country during their enforced period of idleness, which extends from four to six months in a year. At present many of these industries have become either extinct or are in the process of decay due to want of encouragement both from the Government and the people. The All-India Village Industries Association started under the auspices of the Indian National Congress a few months ago is a very welcome move in the right direction. Its objects are to revive the dead and dying industries in the country and to bring them back to a state of prosperity. The Government also have come to realise the importance of this problem

and have recently sanctioned Rs 5 lakhs to revive the Handloom Industry all over India. Handloom Industry is one of the most important and the biggest industry in India which affords employment to a large number of the people, and gives some income to the idle agriculturists, and if properly developed, has vast potentialities in this country, which was once the home of cotton and silk textiles of world fame. Equally important are Handspinning, Cutlery, Pottery, Mat & Coir-making, Basket & Toy-making, Gur-making, Paddy-husking, Oil-crushing, etc., as they considerably help the poor people in the villages to earn their livelihood or to supplement their income. It must be emphasised that the development of these cottage industries would usher in prosperity to the people in rural areas. Signs of the revival of the interest of the people in the industrial development of the country are already visible. The Government, have been making spasmodic endeavours for development of industries but have not yet embarked upon any definite and well-chalked out programme of national reconstruction based on a sound system of economic planning. I earnestly hope that the Government will evolve an appropriate national policy of development of industries and take suitable action for achieving that object in consultation with the accredited representatives of the people.

HOW INSURANCE COMPANIES CAN HELP THE DEVELOPMENTS OF INDUSTRIES.

[By DR. S. C. ROY.]

THE question of developing our industries are attracting the serious attention of our political and economic thinkers. But the problem of problems is the question of adequate funds for the purpose. It is admitted on all hands that India can be self-sufficient so far as its industrial requirements are concerned provided necessary capital is available to develop its raw materials. I do not want to raise here the question of the advisability or otherwise of inviting foreign capital, want of technical experts, and

such other important questions, in relation to the industrial development of the country. These are subjects which can be dealt with separately. We propose to discuss here only one aspect of the problem and that is how and to what extent Insurance Companies can contribute their quota of help to any scheme of industrialisation of the country.

I should like to make it clear that the funds belonging to Insurance Companies are really trust properties and the Directors or Shareholders of a Company have no legal or moral right to take undue risks. There is a general tendency among a section of the public that Insurance Companies as such owe it to the public to invest their funds in industrial concerns. I know of an instance when a well-known editor of a finance journal actually complained to one prominent director of a big insurance company that they are not encouraging the Swadeshi Industries by lending money to these concerns. I remember distinctly what answers the editor received and how he had to admit that the company has done the right thing by refusing to invest in the shares of some of the concerns mentioned by the editor. This general tendency of criticising the Insurance Companies for not doing their duty is daily increasing. Some companies have actually been formed in the country with the avowed object of investing all their funds in industries of the country and they are creating an atmosphere that the older companies have not done their duty to the country—and the new entrants to the field propose to do it!

It is a noble idea and it cannot be denied that National Insurance Companies can do lots to help the development of National Industries provided certain definite conditions are fulfilled. We should not forget that financial obligations for helping deserving industrial concerns should be and ought to be performed by Industrial Trusts & Industrial Banks. Insurance Companies may and perhaps should help these Banks by keeping funds in long term deposits, or in other words it is desirable that Insurance Companies should not directly advance

moneys or undertake the risk of purchasing shares of industrial concerns. It is advisable to stand behind sound Industrial Trusts or Banks to supply them with necessary funds to finance industrial concerns.

This general remark applies to all big or small propositions. Insurance Companies' funds should never be invested in any speculative enterprise or in any venture where there is even a remote chance of losing the money. There are experts and well-known actuaries who are definitely of opinion that at least 80% of the Insurance Companies' funds must be invested in Gilt-edged Securities. I do not propose to discuss the correctness or otherwise of this theory. I am more concerned here with the discussion of the practical aspect of the question of investment in industrial concerns. I have already said that it is not the function of Insurance Companies to finance industries. The primary function of an Insurance Company is to look to the ultimate interests of the policyholders. The question of helping industries or investment of the funds in any manner, is subject to the limitation that the funds are safely invested. Every other consideration is subject to this fundamental question.

But what I want to say here is this that there is some scope, and I may say, substantial scope even within these limitations to help the growth of essential industries of the country by Insurance Companies. As I have said, the first and safest method of such investment is through Investment Trusts or Industrial Banks where the actual risks of the business are undertaken by the Trusts or Banks—the Insurance Companies standing behind them to help them with funds as and when in need.

The second method of investment is perhaps in the shape of purchasing debentures by Insurance Companies with a good margin of security. Here also the Insurance Companies do not take the business risks but advance money against solid assets of the industrial concerns. The general practice of such investment is to purchase debentures with 50% margin and that is supposed to be a safe

margin. It may be concluded from what I have said above that an Insurance Company may, if necessary, invest about 50% of the total block capital of an industrial concern. If really genuine companies with honest and experienced Board of Directors want to raise money on this class of first mortgage debentures the Insurance Companies can be of great help to them.

I may give a specific example here:—A Sugar Company is proposed to be started, say in Nadia District to manufacture sugar by direct method and the total cost of Land, Plant and Machines, Buildings, etc., is about 12 Lacs. Now, if the Company is in need of funds and if it is raised as debenture or even as first mortgage loan at a reasonable rate of interest, I think, the Insurance Companies may safely purchase these debentures and thereby indirectly help the company with half of the Capital.

I am definitely of opinion that Insurance Companies should not purchase shares or advance moneys directly to any class of industries. It may be mentioned here that some relaxation to this practice may be allowed in cases where monopoly concerns like Electrical Companies who want to borrow money or when loans are taken by local bodies for development purposes.

In India there are about 200 Life Insurance Companies and according to the latest Blue Book the total available funds of these Indian Companies come to about Rs. 32 Crores. The Non-Indian Companies have got funds of about 38 Crores and it is claimed that this big sum is invested in India.

Now, what proportion of this fund may be invested in industrial concerns? Taking even the most cautious view we may safely say that an investment of 15 to 20% of the total funds against the first mortgage debentures of industrial concern will allow Indian Insurance Companies alone to supply about 6/7 Crores of Rupees. I am taking for granted that Non-Indian Companies' investments are not going to directly help our industries, although it cannot be denied that these funds also indirectly help industries in

India under the management and control of the respective foreign nationals. I am also not mentioning anything about funds belonging to General Insurance Companies, because they can not invest in long term loans as pure Life Companies can.

Another method by which Insurance Companies can invest moneys in industrial concern may be mentioned. There are many essential industries and in these industries the State is vitally interested. If the Govt. guarantees the safety of the funds national industries can progress more rapidly with the help of Insurance Companies' funds than under any other method. Govt. guarantee may mean indirect or direct Govt. control and supervision of those concerns but in a country where we are to depend on foreign countries for our everyday requirements it is the duty of the Govt. to come forward to guarantee the safety of the capital amount and thus invite funds from the general public. It is unfortunate that for various reasons our Indian Minister in charge of Industries is unable to take any initiative in the matter. The Govt. can certainly exercise certain amount of supervision and guarantee the safety of the capital and at once bring into existence many industrial concerns. We can only look for the day when Provincial Autonomy will be real to give such powers to our Ministers.

Unless opportunities are created for Indian Insurance Companies it is difficult for them to invest their funds in higher proportion for industrial development. But creation of opportunities depend on several factors and I have no doubt that both the Insurance Companies, who are unable to earn more than 3½% in Govt. Securities, and the industrial concerns who are in need of long-term advances, will try to find out an acceptable formula on the lines suggested above to enable Insurance Companies to invest their funds more freely in developing the Industries of the Country.

ECONOMIC SITUATION IN INDIA.

[By MR. MANU SUBEDAR.]

RECENTLY there is a new refrain in the annual speeches of Viceroys and Governors in India, that the Joint Select Committee's Report and the new India Bill envisage a constitution, which is good for India and that the safeguards would remain a dead letter in practice. If the safeguards are going to be a dead letter in practice, one would naturally ask why they are being introduced against the common and unanimous feeling throughout this country amongst all parties. The view, which the Indian public opinion takes of this subject, is that the safeguards, if at all introduced, should satisfy the criterion laid down in the Irwin-Gandhi Pact, viz., that they must be demonstrably in the interests of India. The fact that these safeguards have been increased in number and strengthened in terms and that reserve powers have been created so as to prevent ostensibly legislative, and administrative discrimination but practically everything else makes, to our mind, a travesty of the constitution, putting in the front rank, not the financial and economic requirements of this country, but the financial and economic interests of the United Kingdom. As such, the constitution would be regarded as having been imposed on India. It is different from what has been asked for. This result is the symptom of this country's political disunity and backwardness and not the triumph of Indian public opinion. Much of what Indian opinion has demanded, has, however, not been conceded.

The balancing of different interests is a problem before all Governments in the world, but in India it is being used on many occasions by official apologists not in order to round off the corners of Government programme evolved in response to popular demand itself, but in order to suppress such popular demand and to establish in the popular mind the wisdom of the course, which Government actually pursue.

ECONOMIC PLANNING.

The fixed economic notions of every nation in the world have been uprooted.

Free trade countries like the United Kingdom, have embraced protection and have raised, under the title of 'safeguarding' enormous tariff walls. On the plea of securing the home market to home producers, they have set up quotas for the import of non-British material. Countries like Germany, which had organized definitely for a large export of manufactured articles, are being compelled to seek economic self-sufficiency within their borders. In this general upset, the Indian situation has not been considered by Government on its own merits. Attempt has been made in the United Kingdom to regard India as a free market for the United Kingdom as an integral part of the British Empire, producing raw-materials and semi-finished goods. The enormous industrial development in this country is being ignored and belittled and the trend of policy is more to discourage than to encourage the growth of manufacture. Indians have put forward the goal of self-sufficiency for India in manufactured goods as an ideal to be reached by convenient stages not merely through sentimental economic nationalism, but as a real and permanent solution for the problem of India's poverty and the increasing unemployment of her population. We desire to secure the technical skill, inventiveness and the capacity to organize, which are associated with manufacturing activities. We desire to retain in our country the profit and the perquisites from the sale of manufactured goods, which are at present going abroad. Even for those industries, for which abundant raw materials exist in this country and there is a big market, India is paying an annual tribute running into crores of rupees represented by the difference between the price of such raw materials realised by her population and the price, which is paid by them for the finished articles.

With the Indian Industries Commission of 1916, we had hopes that the Government of the country had accepted the policy of increasing industrialisation in India on suitable lines as opportunities arose, but a review of twenty years'

activities gives a rude shock to such hopes. From time to time comments have been made on the defect of the machinery for granting protection to Indian industries when they are assailed not only by normal competition from abroad, but by subsidised onslaught favoured by exchange factors and other extraneous considerations. It is a matter of wonder that, in spite of these disabilities, private enterprise has come forth in India for industrial development and that the progress so far recorded has taken place.

The Indian outlook on this subject has been deprecated as an attempt to neglect agriculture or reduce its importance. Such an attempt, unfortunately, has been made from the highest quarters, but its foundation lies in a misapprehension. The best friend of the Indian agriculturist is the Indian industrialist, who offers him a ready market at home, sure and at all times and uninfluenced by happenings abroad. In an age, where foreign agriculture is making great headway, assisted by machinery and invention, Indian agriculture itself is threatened. Such a threat has arisen already in the past in the matter of Indian fruits, rice, wheat and sugar, and it might extend to other important items of Indian agriculture. The incentive to improvement in agriculture arises more directly, where local manufacturers indicate their preference for better quality in the case of commercial crops. India's purchasing power and Indian demand should be so organized at home as to assist not merely Indian industries, but Indian agriculture.

LACK OF A SCIENTIFIC TARIFF.

All this could be secured only when there is a plan, in which the economic and financial issues are all well balanced. Even powerful countries, like the United Kingdom and the United States, are experiencing economic difficulties and have felt the necessity of such a plan, but in India Government is content to drift. They are content to take piecemeal measures, as in the case of the proposed Marketing Organization. I do not say that human wit could devise a program-

me that would be good for all times and could be realised in all details. But we are still in the elementary stage, where we have to persuade the Government of the country to accept the need of such a programme. In any such programme I would give a very high place to the revision of the Indian tariff system. The schedule of Indian tariffs operating at present has grown up haphazard and without a design. We find traces of every idea, that has struck the Government of the country in that schedule, but what we cannot find, because it does not exist there, is a scientific grasp of the situation in correlation to a definite economic whole. We have cases, where the raw material is imported at a heavy rate of duty, while the finished product gets in free or very low. This is on some excuse or the other, but, in the end, it is calculated to prevent the growth of industry and growth of employment in this country. Thus printed material, which comes in free, damages the manufacturer of paper and of ink and of printing machinery and of stationery, as well as the business of publishers and printers in India, but we are told that there should be no tax on knowledge. It encourages Indians to publish their books abroad. On the ground of favouring electrical equipment, much fabricated steel is allowed to come in at rates, at which it cannot be produced in India. On the ground of cheapening stores for the textile industry, stuff is coming in, competing in the local market in the matter of sizing materials, chemicals and a large number of miscellaneous articles. I find in the schedule of metals that, there is little or no difference between the duty charged on ingot, sheet and circle and the final manufactures. This kind of schedule would do credit to a military government,

which existed in the middle ages, but any country in the world would be ashamed to have its tariff system in such disorder. If we had a national government, the very first task would be to define some definite economic aims and to see that the tariff schedule is directly calculated to advance those aims. We would have differences between the import duty on raw materials, on semi-finished goods and on the final fabrications, which would show that the Government of the day is intelligent enough to see the difference and is anxious to secure as much fabrication in this country as possible. The tariff is in India regarded by Government more as a means of raising revenue than for any other set economic purpose.

While on this subject, I cannot help feeling that this is not the first time that we have expressed ourselves on the subject but our views have been ignored. Formerly, it was regarded that this was a political cry by a small fringe at the top and that Government were doing the right thing as trustees of the masses. Later, it was said that a small group of Indian capitalists were out to exploit the masses and Britain would not permit it. But now when it has been definitely proved that there is a serious and continuing deterioration in the condition of the masses, which requires this economic planning and which requires growing industrialisation for the absorption of our population, we would await what official apoligists have to say for the confusion in the financial system of the country, for the unscientific and blind groping in the tariff schedule, and for uncorrelated cross currents in the policies of various public departments of Government themselves, which effect the economic life of the country and of the masses adversity.

Manufacture of Metal Tubes & Pipes.

TUBES and pipes are essential requisites of the day and may be said to have originated in the practical application of science to the wants of the present and coming generations; as pipes to let pure water in and carry foul water out, pipes for warming, ventilating, and drainage, pipes to bring in gas, and to carry away the results of its combustion, pipes for the rich man's marble or earthenware baths, pipes for fountains and cess pools, for arresting conflagration and pestilence, for the locomotive on the iron rail, and the steam boat as it cleaves the ocean-wave. This brief allusion to the multifarious uses to which pipes and tubes are applied may be accepted either as introductory to the *modus operandi* or means by which tubes are produced from various metals. There is every reason to believe that in the early stages of tube-manufacture tubes generally were formed by casting, the aperture being produced by means of a core of sand laid in a print in a mould. They were cast in short lengths, and soldered together, or they were turned up from flat sheet metal and the edges united by means of soldering if lead or brass; or if of iron, they were welded; the methods of manipulation now adopted arising from the increasing demand for such forms of metal.

LEAD PIPES.

Lead pipes were formerly produced by being cast in sand-moulds, a cylinder or core of sand being laid in corresponding to the internal diameter of the aperture. These were cast in short lengths and soldered together with soft solder at the seam or junction of the two edges of

the sheet lead; then followed the process by which the tube was elongated from a thick cylinder, or billet of lead, by means of the drawbench, the billet in its interior being supported by a mandril of steel; and in that condition it was drawn through a succession of wortles or tools which diminished the external diameter of the billet until the desired external diameter of the tube was arrived at.

The billet was cast in metal moulds or chills; into the space between the inside of the mould and the mandril the lead was poured; the result was a casting or billet, when the mould was opened, and the mandril withdrawn. The result was a hollow cylinder in section. Into the space of the mould a mandril was introduced corresponding to the internal diameter of the intended tube and its parallel part being of the length of the tube. The billet alluded to was next passed on to the mandril and held by the shoulder of the diminishing part thereof in front of the nose of the billet, and on the reduced portion of the mandril a series of "wortles" or "dies" were placed, diminishing in diameter to the required external size of the tube; in this condition the mandril and billet was taken to the drawbench, the largest die placed against the snags or rest for the die, and the billet drawn through and thereby reduced in diameter and elongated; then followed drawing through the other and smaller or diminishing dies in succession as described; the last operation consisted in withdrawing the spit or mandril; an easy operation and simply effected by reversing the billet and using a die, the full size

of the mandril to be withdrawn, the drawbench assisting in the operation.

By a similar process, block tin tube, now so largely used in gas-fitting, for liquor fountains, and other purposes is still made; its brightness being produced in the process of drawing by a cutting-die, which shaves off a thin portion of the metal and exposes its brilliancy; the polish is given by the dies which follow in succession. It will however, be evident that the process alluded to is a slow one, and but imperfectly adapted to supply the great demand for lead-pipes now existing.

An exceedingly rapid process for its production is now adopted, in which an hydraulic press, operating on a molten mass of lead, forces it in its melted state

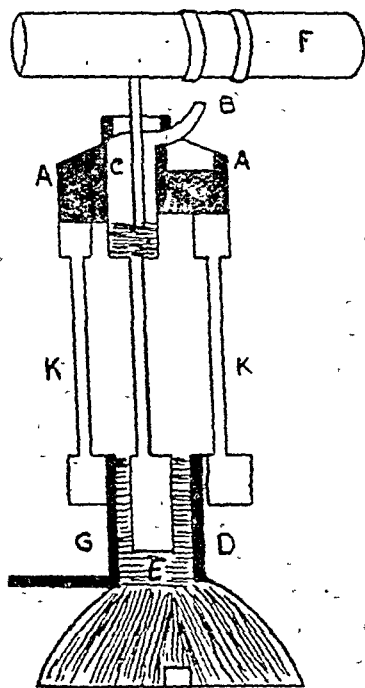


Fig. A.

through a suitably formed annular space, and produces lengths of tube limited only in their length by the quantity of liquid lead operated upon. The machine as shown in the diagram consists of a double-ended piston, operated upon by a hydraulic apparatus, a lead furnace, and a nosel or exit from which issues the pipe made. Supported on pillars K K stands an arrangement of metal in which is enclosed an annular furnace under C, represented by A A with provision for introducing fire. In the centre marked C is the melted lead contained in a cylinder fitted with piston, connected with that of the hydraulic press D; the lead is introduced by means of a spout or feeder, B; on the cylinder C, being filled, the feeder B, is unscrewed, and a solid plug introduced. The white line ascending through the space; C, is a mandril, which is the size of the interior of the intended tube. K represents suitably formed dies the size of the external diameter of the tube required; the space between the interior of the die and the exterior of the mandril is that through which the melted lead is forced which forms the tube, it being formed, congealed, or solidified at the point where it comes in contact with the external atmosphere, the forcing up of the lead being produced by the water in gate-pipe G being connected with the pump which, set in motion, forces the water under the packing of the piston E; this raises it, and it in turn, operating on the piston, which works up in the interior of the cylinder containing the fluid, or melted lead, presses it out from the space between the die and the mandril. As the tube is made it is wound into coils on a revolving drum F, which is placed over

the press; the size of the mandril and the die may be changed, and tubes of lead of any size and length can be produced by this ingenious process, alike simple and speedy in its operation.

WROUGHT IRON TUBE.

There is an immense demand for wrought iron welded tube now universally used in conducting gas for lighting, water, steam for heating, or for boilers for engine (though there are reasons for believing that for the last two purposes the application of good brass tubes as a substitute is on the increase). In the manufacture of "butt" and lap jointed tube, the iron of which the tube is made, is received from the iron manufacturer in the form, thickness, and breadth required for the tubes of the various diameters and thicknesses of metal necessary for the purposes intended: it is cut into lengths, and then heated to a red heat in a reverberatory furnace of sufficient length to heat the iron at one operation. This furnace is similar in construction to a soldering stove; the heat is also regulated by dampers; it can, however, be raised to a higher temperature. When heated the 'skelp' at its end is beaten into a semi-tubular form, and after passing it through the tool, it is taken hold of with the plyers of the drawbench and drawn through its entire length, the tool either

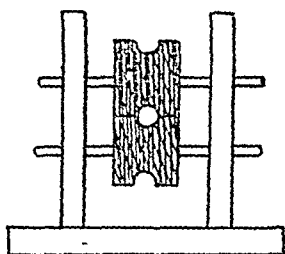


Fig. B.

being a pair of rolls, as in fig. B, or a two-part conical pair of dies emitted together as a pair of plyers. Now for welding purpose the tube is heated for the second time and worked up with the tool of the type shown in fig. C.

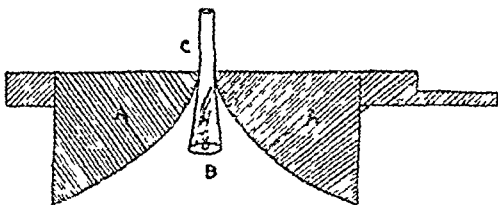


Fig. C.

In this machine A A is section of bell mouthed tool; B the unwelded tube; C, the portion drawn through the tool or die, and welded in passing through; this completes the manufacture of a "butt" or jump-joint welded tube for gas or the transmission of a fluid in which the pressure is not great.

In the manufacture of a 'lap' welded tube, the manipulation is more complicated, as the edges of the iron to be welded require to be thinned preparatory to welding, and this is effected by drawing the edge of the sheet against a suitably-formed cutter, which cuts away the desired metal from the opposite sides of the metal, which come together and form the 'lap' to be welded. The flat strip is then worked into an oval form in its entire length, the lap being in the centre of the longest diameter of the oval in a transverse section. Down the centre of this oval-formed tube or unwelded cylinder, a mandril is introduced which forms an internal support the tube being heated and the mandril inserted, the tube is passed through rolls to effect and com-

plete weld. The tube is brought into a cylindrical form by passing through rolls, the reverse or largest diameter being compressed or converted thereby into a cylindrical tube; the rolls are operated upon by screws which permit of these being pressed down into closer contact, and to convert an oval opening in the rolls when as under or not screwed down into a circular opening, when the rolls are brought into closer contact.

STEEL TUBES, GUN BARRELS, ETC.

The manufacture of steel tubes for ordnance, gun-barrels and tubes for other purposes has recently been carried into practical usefulness in Europe and America, and more particularly so since the extensive application of the Bessemer process. Ingots of iron produced by the process named reheated, and hammered in every direction, so as to ensure perfect homogeneity of substance and material, and the ingot reduced in thickness and increased in breadth. To form a cylinder the centre of the blank of steel is operated upon by a punch moved by machinery, which not only condenses the metal operated upon, but in moving radically forms or raises the disc-like mass into a partially-formed solid-ended crude cup, eventually into a steel billet: into the centre of the billet a mandril is inserted, and it is elongated and compressed until the desired length and dimensions of the tube required are arrived at. The lightness and strength of steel in a tubular form suggests its applicability to large-sized shafting hitherto made of solid iron, and to other purposes where great masses of steel were forged solid and bored out. When this process of manufacture is per-

fect, and consequently cheapened by being more generally applied, steel tubes, cylinders, and hollow shafts will supersede the use of tubes, large solid shaftings, and many tubular articles now made of iron.

ORDINARY BRASS TUBES.

This variety of brass tubes is made from brass cast in thick strips, and rolled out into sheets of the thickness required. These sheets are cut into ribbons in breadth corresponding to that necessary to produce, when turned up, tubes of the various diameters required. This is done by means of revolving discs of steel, or cutters fitted into a frame, and operated upon by a winch-handle when worked by hand, or attached to a shaft in connection with an engine when moved by power. See fig. D.

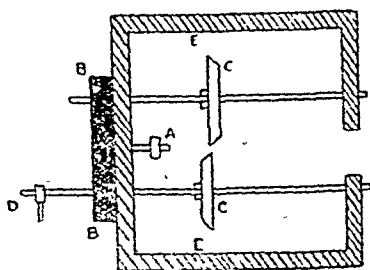


Fig. D.

E E represents cast iron frame; C C the revolving discs of steel, or cutters; A, a movable gauge, in order to determine the breadth and guide the edge of the sheet brass to be cut; B B are pinions which are attached to the spindles which carry the cutters, and D the winch-handle to move the cutters which are worked by hand.

When the metal of which the tube is made is thin, and the tube is small in diameter, it is readily formed into a cylinder by simply converting the end of the

ribbon into a tange by hammering together the metal which forms the end of the ribbon, in order to allow it to enter the drawing tool, using also an additional funnel-shaped tool to gather up or concave the ribbon in its width. This is assisted by a tapering iron plug held in the funnel-shaped gathering up tool already alluded to.

When the metal is passed through these tools, the brass ribbon is converted into a tubular form, the edges of the ribbon forming a longitudinal opening down the entire length of the partially-formed tube; this longitudinal opening or slit and the edges of the metal are brought closer together by removing a wedge and checking the passage of the ribbon, when the pull of the draw-bench brings the two edges of the partially-formed tube closer together. Tubes of larger diameter and of thicker metal, however, require the breadth of metal necessary for their construction to be rendered concave in their entire length, to facilitate the operation of turning the metal up; and this is done by means of a pair of rolls, one of which has on it a series of projecting beads of varying diameters in convexity; the corresponding roll has corresponding concave grooves. The width of metal is presented to that portion of the roll which will impart the necessary degree of concavity to the strip in its entire length. It is then passed through the rolls, and in passing through is converted into a concave trough like piece of sheet metal. As in former description in reference to thin metal, the end of the metal is beaten into a tange to be caught by the plyers of the drawbench. This tange is passed through the drawing tool,

laid hold of by the plyers, and drawn through the tool; its edges are drawn together by a final pinch or pull of the drawbench. The next operation is that of soldering or uniting the two edges of the metal together; previous to this the partially-formed tube is annealed, and immersed in a solution of weak acid, which removes the scale and grease used in lubricating the metal to facilitate its passage through the tool in turning up from a ribbon to its tube-like form. After the acid is removed by immersion in pure water, the open jointed tube is in a condition to be soldered at the joint; previous to this it is necessary to bind the tube round with wire a greater or less distances, in order to prevent the seam from opening in the fire when the metal becomes relaxed with the heat of the soldering stove. The wire used is annealed or soft-iron wire, it is passed round the tube, and its ends twisted together. Along the open joint is laid granulated brass solder, mixed with borax, the latter acting as a flux, at the same time keeping the edges of the joint clean. The solder fuses at a lower temperature than the tube to be soldered. When the solder has been distributed along the seam of the tube, the tube is in a condition to be passed into the hands of the operator. The soldering furnace or stove has a provision for a fire 6 or 7 feet long, which burns in a fire-brick square tunnel, open at both ends for the introduction of the unsoldered tube at one end, and when soldered to remove it at the opposite end.

A A A A A of the diagram is brick-work; D D, dampers, to regulate the draught of fire and increase or diminish its intensity; C C are iron bars, on which

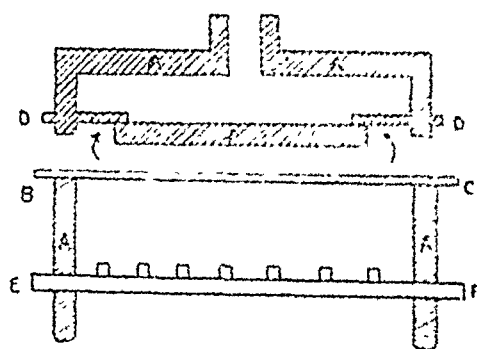


Fig. E.

those rest on which the fire is placed; and B B the tube which is to undergo the soldering process. The pipe is inserted at one end, the fire playing under and over it, speedily heats the tube; the necessary heat to fuse the solder arrived at, it fuses and unites the two edges of the metal, and the operation of soldering is completed. If the tube has been bound round with wires, these are untwisted and taken off, and in order to get rid of the borax, the tubes are immersed in long troughs of wood, lined with lead and filled with a "pickle," composed of a solution of oil of vitriol and water. After remaining in this bath for a limited period, and being rinsed out in water, the superfluous solder is filed off, and the tube is in a condition to receive its final finish in the drawbench, which is effected by placing a drawing-tool so formed that its internal diameter has more friction on its tube than the one used for turning up the tube from the ribbon, the tange of the tube is passed through the tool, and laid hold of by the plyers attached to the chain of the bench, the wheels are thrown into gear, and the tube is drawn through and receives in the operation of fine smooth surface apparent on well and carefully drawn brass tubes.

ORNAMENTED TUBES.

The action of the drawbench being, as its name indicates, to draw or pull a partially formed cylinder through a steel tool or die, the tool or die being placed at right angles, the aperture in the centre of the tool being placed parallel to the surface of the top of the drawbench, suggests that if the tube is cylindrical, reeded, fluted, square, oval, hexagonal, polygonal, or angular in its entire length, any of these forms may readily be produced, by simply substituting draw-plate, the aperture of which corresponds to the external configuration of the desired form of the tube. Tubes which have spiral, concave, or convex twists or threads, traversing their entire length, however, require peculiarly formed tools or dies, and an arrangement in their use to meet the requirements of the desired style of ornamentation.

Tubes are usually ornamented by the introduction of perforated sheet zinc between two sheets of metal, and in that position the three sheets are passed through a pair of rolls, the perforated zinc by the pressure in rolling, being forced into the surface of the brass to be ornamented; the raised portions of ornament are in the form of relief corresponding to the perforations in the zinc introduced between the two sheets of brass to be ornamented. The same effect would be produced by steel rolls cut with ornamental devices on their outer circumference, but the expense of such rolls being very great, the perforated zinc, considering the limited character of the demand for such tubes, is more economical. The ornamental metal being cut up into the breadth re-

quired, is made into tube by the process already described as that by which ordinary soldered cylindrical brass tube is made.

Another variety of ornamental tube is produced by a very ingenious process introduced by Mr. Fearn. In this process the ornament is impressed on the surface of the tube after it is made; the tool used is formed by a construction of rolls, the internal surface of the rollers which press upon the tube cut with the necessary design, the cylindrical or other tube to be ornamented is supported internally by a mandril, and in passing it through the combined tool or die, the rollers revolve and indent the design cut on their circumference into the surface of the plain tube to be ornamented.

MANUFACTURE OF MANDRIL-DRAWN TUBES

This variety of tubes is perfectly cylindrical in their internal and external diameters. It is chiefly made of brass or copper; the former material is principally used in the manufacture of optical instruments, more particularly telescopes, dependent for their perfection in working on tubes of the utmost degree of accuracy and perfectly cylindrical form, to ensure steadiness when in work; large quantities of mandril-drawn tubes are also used for the barrels of garden and other syringes, telescopic hearth-brushes and toasting forks, etc.; while ordinary soldered jointed brass tube could not be successfully used, or if used, would require an amount of labour to fit it for the purpose, obviously out of place with the expeditious modes of working now in existence. The elasticity resulting from the process of mandril-drawing, is another advantage in connection with

this process, arising from the condensation of the particles of the brass of which the tube is made, these being forced down or compressed by the action of the unyielding steel tool, and the equally unyielding mandril or spit which internally supports the ordinary brass tube subjected to the process. An ordinary brass tube is unequal in thickness internally throughout its entire length; the two edges of the strip from which it is made and where it is soldered, are clearly seen. The manufacture of light brass mandril-drawn tube is practised as follows. A carefully selected and well-forged cylinder of steel is turned to a perfect cylinder by means of a slide rest, and carefully polished; the brass tube made in the way already described, is slipped on the mandril; in this position the mandril and sheath of brass is presented to the die in the drawbench; and is drawn through the tool which forms outside surface of the tube, compressing the metal, reducing the thickness, and compelling it to embrace the steel mandril or internal support. The result is an elastic brass tube. The air being expelled between the tube and the mandril, considerable difficulty arises in releasing the tube from the mandril, and this is effected by means of a collet or collar a little larger than the steel mandril, but less in aperture than the tube; the collet is placed in position of the drawing tool, the reverse end of the mandril being operated upon, as in drawing the tube, the result is that the tube is withdrawn from its internal support, and if the mandril has been correctly turned, a perfectly cylindrical tube is the result of the preceding operations. In the accompanying diagram the arrange-

ment of mandril and tube to be drawn, and tool, are shown. A A represents the mandril, BB the brass to be operated upon; CC, section of the tool; the thickness of line to the left of the tool CC indicates that part of the brass which has not been subjected to the operation of the drawing tool. The release of the drawn tube is shown in the other figure; the collar C is substituted in the drawbench for the tool shown in the preceding figure; the thick end of mandril A, passed through this, is taken hold of by the plyers of the drawbench; the end of the metal of the tube presents a resistance, while the force of the drawbench drags out or releases the mandril from the drawn tube.

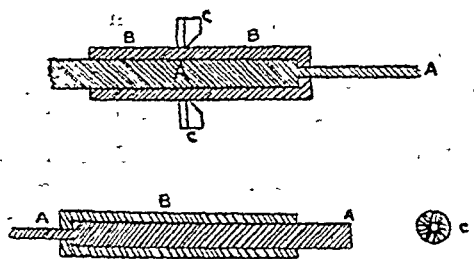


Fig. F.

BRASS-CASED TUBES.

The manufacture of brass-cased tube or iron tube cased with brass, can be properly done in the following manner:—Sheet iron of good quality, if for articles which do not require to be bent in manufacture, as in rods for pictures, straight railings, etc.; but if the tube is to be bent, charcoal iron is selected; the sheets of iron are cut up with circular cutters as shown above; and the ribbon arising from the cutting or slitting of sheet iron is concaved in its entire length by passing it through rolls. It is drawn into tube at the drawbench; in this state;

if the tube is intended for articles which are to remain straight, the iron tube is in a condition to allow of its receiving its case of brass; if it is intended that the tube should be bent, the iron tube is soldered together at the seam, as already described in the manufacture of soldered brass tube, the brass sheath intended to cover the iron tube or to case it with, is made of such an internal diameter as will slide over the iron tube it is intended to “case” or cover, the brass case being turned up, made, and soldered, as already described in the manufacture of soldered brass tube. The brass sheath is then slid over the iron tube; in this position the end of the two united tubes of iron and brass is passed through the drawing tool; the pressure resulting from the action of the drawbench causes the external brass sheath or tube to embrace firmly the iron tube in its interior, and an externally brass and internally iron tube is produced thereby.

ESTIMATE FOR MACHINERIES.

As all the operations in tube making are carried on by machines, there are several large and small machines required for the purpose. Some of the most useful machines are shown in the illustrations. Their costs are more or less than Rs. 10,000/-. Anyone with a capital of 15 to 20 thousand of rupees can start the industry on a moderate scale.

FINISHING OPERATIONS.

In finishing tubes, which are rather large the external skin of the tubes are removed by means of floats, that is flies cut in one direction only. For this purpose the tube to be floated is attached to a horizontal bed; the floats, five in number, more parallel, and in a longitudinal

direction Each in its operation passes a little into the space previously floated; the tube is turned by a machine and a new surface is exposed to be operated upon. The next operation after, floating is polishing, which is either effected by hand with list passed round the tube, the tube being lubricated with rotten-stone and oil revolves by machinery; the tubes being passed in, is polished by the revolution of the buff; the final polish is given by dry list, with powdered dry rotten-stone. The tubes are finally protected from oxidation by a lacquer applied with a camel's hair brush when the tube is heated, which is done either by laying the tube to be lacquered on a hot iron plate, or by passing through its interior a jet of steam.

PROSPECTS.

The prospects of tube making in India are too numerous to be mentioned here. The introduction of water into private and public establishments, the use of tubes for the conveyance of gas, the large demands for tubes in the construction and repairing of locomotive and other engine boilers clearly indicate the enormous prospect for developing this mechanical industry.

MANUFACTURE OF ULTRAMARINE.

ULTRAMARINE is a splendid blue colour, formerly obtained in small quantities from lazulite. Huge quantity of this substance is consumed in this country annually in various arts and industries, such as a pigment in stereochromy, in paint for paper-hangings, in calico-printing with albumen as fixing material, for colouring printing ink, for the bluing of linen and cotton fabrics,

paper, stearine and paraffin candles, and lump-sugar. In view of these facts, it would appear to be highly desirable that the manufacture should be undertaken in this country.

RAW MATERIALS

The raw materials for the manufacture of ultramarine are:—

1. Aluminium silicate as free as possible from iron, a good china clay being esteemed best.
2. Calcined sodium sulphate.
3. Calcined soda.
4. Sodium sulphide.
5. Sulphur.
6. Pulverised charcoal or coal.

Porcelain or china clay is generally used. Small quantities of lime and magnesia have no injurious effect, but the oxide of iron should not exceed 1 per cent. The composition of clay should approach as nearly as possible to the formula $H_2 Al_2 Si_2 O_8$; the silica may be combined or partly free. The clay is first washed with water and is next dried, ignited, and ground to a very fine powder.

The sodium sulphate should not contain any free acid, lead or iron. If the sulphate does not possess the requisite qualities; it is dissolved in water, milk of lime being added to neutralise the acid and to precipitate oxide of iron. The clear solution is left to crystallise and the crystals are ignited in a reverberatory furnace and then pulverised. The clear solution is in some cases evaporated to dryness and ignited in iron vessels.

The calcined soda as obtained from alkali works should not contain at least 90 per cent of sodium carbonate; it is also finely pulverised.

Sodium sulphide is usually a by-product of the process of making ultramarine, and is obtained either in solution or as a dry powder. The sulphur is used very finely pulverised. The carbonaceous matter employed is also in a very fine powder. In order to have the carbon in as finely divided a state as possible it is ground to a pulp with water under granite stones; the pulp is lixiviated, and the fine powder obtained dried and passed through a sieve; in some cases resin and pitch are employed. For ultramarines which must not have their colour discharged by alum, pure silica, either as fine glass, sand, or pulverised quartz, is used. Several substances are used to reduce the depth of colour of ultramarine—viz., gypsum, barium sulphate, baryta white, and flour; the last is employed in making up washing blue.

DIFFERENT METHODS OF MANUFACTURE.

The methods of ultramarine preparation may be classified, according to the crude materials employed, into three:—

1. Preparation of sulphate-ultramarine.
2. Preparation of soda-ultramarine.
3. Preparation of silica-ultramarine.

SULPHATE-ULTRAMARINE.

This ultramarine is prepared from china clay, sodium sulphate, and charcoal; the preparation consisting in two distinct stages viz:—

- (a) Preparation of green ultramarine.
- (b) Conversion of green into blue ultramarine.

GREEN ULTRAMARINE.

In order to obtain a most intimate mixture of the dry and finely pulverised

materials, small quantities are weighed off, mixed in wooden troughs by means of shovels, and several times passed through sieves. If solutions of Glauber's salt, soda and sodium sulphide are used instead of powders the kaolin is mixed with these solutions, and the whole evaporated to dryness, gently ignited in a reverberatory furnace, and then pulverised and sifted. The quantities of the crude materials vary, but the following conditions have to be complied with:

1. Soda sulphide must be present in such quantity that it can saturate half of the silica of the clay. 2. There must be sufficient soda remaining to form with the sulphur a certain quantity of polysulphide of sodium. 3. There ought to remain enough sulphur and sodium to form another sodium sulphide after deducting from the whole mixture as much green ultramarine as the silica and alumina present are capable of forming. The following figures will give an idea of the proportions:—

	I	II
China clay or kaolin (dried)	100	100
Calcined sodium sulphate	83	41
Calcined soda	—	41
Carbon (char-or pit-coal)	17	17
Sulphur	—	13
For 100 parts of calcined soda	80	
parts of calcined sulphate of sodium, and		
for 100 parts of the latter 60 of dry		
sodium sulphide, may be taken.		

It is usual to have a large quantity of this mixture prepared for use. If this mixture is ignited without access of air, a white mass is obtained, which, having been treated with water, is a light, somewhat flocculent, white substance, called white ultramarine. It becomes green by

exposure to air, and blue by being calcined in contact with air. The mixture is well rammed into fire-clay crucibles, placed in muffle or reverberatory furnaces similar in construction to those used for burning earthenware and porcelain, being raised to, and maintained at, a high temperature with a very limited supply of air. This operation lasts from seven to ten hours, and is completed at a bright white heat. The furnace is closed and slowly cooled; on removing the crucibles, the contents appear as a semi-fused grey or yellow-green mass, which is repeatedly treated with water. The ultramarine thus obtained is in porous lumps, which are pulverised into an impalpable powder; this is washed, dried, and again ground, then sifted, and finally packed in boxes or casks, and sent into the market as green ultramarine or it is at once submitted to the next operation.

BLUE ULTRAMARINE

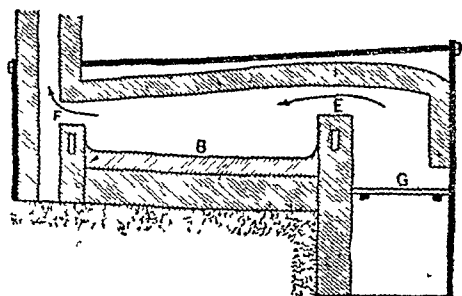
The green substance as obtained above is next converted into blue ultramarine. This operation may be effected in various ways, specially by roasting the green ultramarine and sulphur at a low temperature with access of air, so as to form sulphurous acid, while a portion of the sodium is oxidised into soluble sulphate and afterwards washed out; but

the sulphur originally present in the green ultramarine remains combined with a smaller quantity of sodium. The roasting may be variously carried out, but very frequently the apparatus consists of a fixed iron cylinder similar to a gas-retort, provided with a mechanical stirrer, by means of which the mixture of green ultramarine and sulphur (25 lbs. of the former to 1 lb. of sulphur) is submitted equally to the source of heat. The addition of sulphur is repeated until the desired blue colour is produced; but in some works this calcination is interrupted by repeated lixiviation, the object being to produce a superior article. Muffle furnace and a kind of reverberatory furnace are also used for this operation. The sulphurous acid, which is evolved in large quantities, is now generally employed in making sulphide and also sometimes used in the preparation of sodium sulphate. The ultramarine, when quite blue, is pulverised, lixiviated, dried, and finally separated into various qualities known in the trade as No 00, 1, 2, 3, etc.

SODA ULTRAMARINE

This ultramarine is now largely manufactured in France, Belgium, and Germany. It is prepared either in the form of pure soda ultramarine or a mixture of soda and sulphate-ultramarine. The materials and proportions are:—

	I	II	III.
China clay	100	100	100
Sodium sulphate	—	41	—
Soda	100	41	90
Carbon (char-or pit-coal)	12	17	6
Sulphur	60	13	100
Rosin	—	—	6



Reverberatory Furnace.

The ignition of the mixture takes place either in crucibles, or, better, in a reverberatory furnace; the result is the formation of a brittle and green substance, which absorbs oxygen very rapidly, so that, during cooling the mass in the oven, the greater part is converted into blue ultramarine. The complete conversion, after the addition of sulphur, is obtained by heating to redness in large muffles, the bottoms of which consist of plates of fireclay and the lids of iron, the product being distinguished from the foregoing by a greater depth and beauty of colour. By increasing, within certain limits, the quantities of soda and sulphur, the formation of blue ultramarine may be at once obtained, the product containing 10 to 12 per cent of sulphur.

SILICA ULTRAMARINE.

Silica ultramarine is really soda-ultramarine in the preparation of which silica to the amount of 5 to 10 per cent of the weight of the kaolin is added. The calcination at once yields blue ultramarine, and further treatment with sulphur is therefore unnecessary.

This ultramarine is not acted upon by a solution of alum, and may be recognised by its peculiar red hue, the intensity of which is increased by an increase of silica. Notwithstanding the superiority of the ultramarine obtained by this process, its preparation is disadvantageous owing to the tendency of the mixture of crude materials to fuse during ignition.

AGRICULTURAL INDUSTRY.

[BY MR. BRAJENDRA KISHORE RAY
CHAUDHURY.]

IN A MAINLY agricultural country like ours agricultural industry should form a very important part in its national activities. No scheme of economic planning of which we have been hearing so much of late, can take us out of our present economic impasse if it does not provide for a real development, on a wide scale, of agricultural industry. As a matter of fact our depressed condition is due mostly to our failure to recognise its indispensable necessity. Our agriculture alone cannot help us now. It cannot itself survive for long unless it is very actively backed by allied and subsidiary industries. Time was when the great countries of Europe and America applied themselves almost exclusively to industrial pursuits. Each had its particular industries suited to its conditions. For raw materials it looked to agricultural countries like India. Gradually self aggrandisement and rivalry vitiated their outlook and each began to try to become self-contained in all essential industries. The result was overproduction and competitive prices, followed by efforts at procuring their raw materials and agricultural needs internally, and to-day we find most countries producing materials not only for their industrial requirements but even of their common daily needs. Consequently our markets for agricultural commodities were narrowed down. Not content with this some of these countries are actually exporting agricultural produces to us, and between them and other awakened countries of the East, even our internal market for agri-

culture is being divided. So that to-day we find not only foreign cotton and wheat dumping our internal market, but even Siamese or Japanese rice feeding the Bengali *ryot*. The situation has come to this that the foreign market for our agricultural products has closed against us, some of our own agricultural needs are being met by other countries while we are depending as before on the outside world for most of our finished goods. Under such a condition we cannot exist as a nation for any length of time. Our economic collapse will soon follow if we cannot work out an effective remedy. The remedy lies not only in overhauling our agricultural system by the application of scientific and improved appliances and methods so that we may cope successfully with competition from outside both in the external and internal agricultural markets but at the same time in a nation-wide activity in producing and supplying our own requirements of finished goods and articles prepared chiefly from our raw products. This will not only prevent outflow of our wealth into other countries on account of imported articles, but materially assist our agriculture by utilising and consuming its products and at the same time provide new openings to our unemployed youths. We have lately had to suffer from overproduction and ruinously low prices in the matter of certain agricultural produces. But no evil from overproduction will arise if we know how to utilise the surplus industrially. We may still grow enough of cotton in India provided we convert them into yarn for our clothing materials. The scope in this is still almost limitless and millions of our weav-

ers may still find profitable work in this industry. Sugar-cane may be cultivated in abundance provided we know how to draw sugar from them industrially. If we can at least be self-contained in the consumption of sugar, crores of rupees may be retained in India and millions of our men may be engaged in useful work. Even our ill-fated jute need not so much trouble us if we desire to convert the raw fibres into manufactured articles such as gunnies, gunnybags, hessians, imitation carpets or durries. Not long ago the *kapali* community of Bengal used to earn their livelihood by manufacturing gunnies and gunnybags. Many of them still know the technique but cannot engage in profitable work on account of lack of organisation. True, a portion of our raw jute is manufactured into finished goods in the jute mills. But their consumption is low and output not sufficient and most of their profit flow to out-side capital while our skilled crafts-men work there as mere wage-earners. In many other fields agricultural industry may help us and relieve our distress. It is very well known how many of our raw products find their way to foreign countries to be converted into finished goods there, and re-exported to India for a much higher price. The truth is that our present distress is due to our inertia, and lack of enthusiasm and organised efforts, and the solution does not lie in restrictions of cultivation or imposition of high tariffs, which may be of temporary benefit, but in an all round effort and determination to convert our agricultural commodities into finished goods so that we may get our requirements internally from our own labour. Organised efforts and a

carefully planned programme of work are necessary. It is gratifying to find that the Government is moving actively in the interest of an economic reconstruction and that expert bodies both Central and Provincial have been set up to this end. But mere Government efforts will not suffice, if public co-operation and support are not forthcoming. As agricultural industry must necessarily play a great part in any scheme of national reconstruction of Bengal, a permanent Central Bureau with both official and non-official brain and experience should be immediately set up here to study the problem in all its phases and investigate and explore possibilities and lines of development and marketing facilities for the industry. Affiliated district and village organisations should also be set up to implement their work. Until such bodies are organised our district, local and union Boards should be induced to interest themselves in such activities. If these latter divert a part of their energies from road-making and the like, and devote the same to the revival and uplift of village industry a modest headway may be made in the near future. The task will not be an easy one. The chief obstacle will lie in the fact that we are not industrially minded. Our apathy is to be removed and an industrial taste is to be created in our young men. How this is to be achieved should be the primary duty of the Bureau to discover. One way seems to lie in giving our education an industrial turn. Mere general education cannot save us. If our children are given industrial lessons in the schools, no matter on whatever small scale, and taught the utility and necessity of an industrial career an early impression will be created, and when opportunities are forthcoming they will most readily seize them.

MAKING OF CRICKET BALLS.

THE use of leather bound cricket balls is almost universal among the young cricketers, and there is a rising demand for these in India also. Manufacture of balls will thus provide a lucrative industry to our young industrialists, who would like to take up some new line in the industrial field.

The core of this type of ball is made from very light, resilient material, such as cork. Some manufacturers use cotton waste mixed with shavings, and further samples examined reveals a mixture of articles such as leather, hay, wood-wool, sponge, moss, shavings, and flock, evidently a cheap offal of surrounding industries.

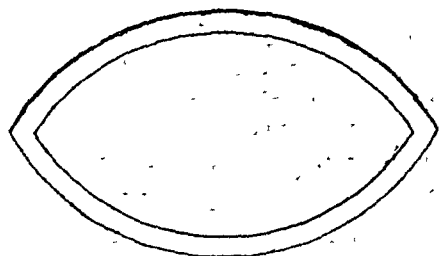


Fig. 1.

The lighter the material for the core the better the ball will bounce when it is finished. There is no other consideration, and it does not matter how tight the material is compressed, or what quantity is used.

The cork is cut into the shape of small cubes. These are then glued together with ordinary glue and when quite dry the cork mass is trimmed neatly round. It is then bound tightly with twine until large enough and glued well all over and hung up to dry. Now procure some suitable leather, not thick but strong, and cut up four sections in the shape of figure 1, in length half and in width a quarter the circumference of the

ball, allowing a quarter of an inch all round for the seam. Then the leather sections are kept immersed in water for a short time to make them soft and then two pieces of this well soaked leather are fixed between two pieces of wood cut to the same shape as the leather, for they act as a guide in sewing. Put them in a vice as shown in the illustration, fig. 2. the inside of the leather outside, and with two harness makers' needles—one on each end of a waxed thread—send them together, making the holes with a small stabbing awl. When the two halves are done, the seams are laid open and hammered down flat. After this the two

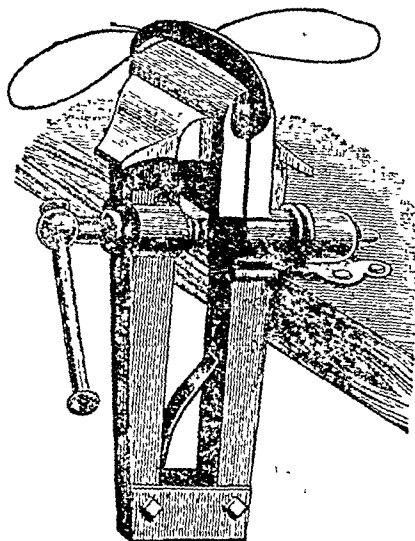


Fig. 2.

halves are sewed together with the cork ball placing inside. There are two ways of performing this operation—one is to sew them together with a straight awl and cut the ends off close, open and hammer down, or to sew it with a bent awl, have the seam bent over, and take in one stitch four pieces of leather instead of

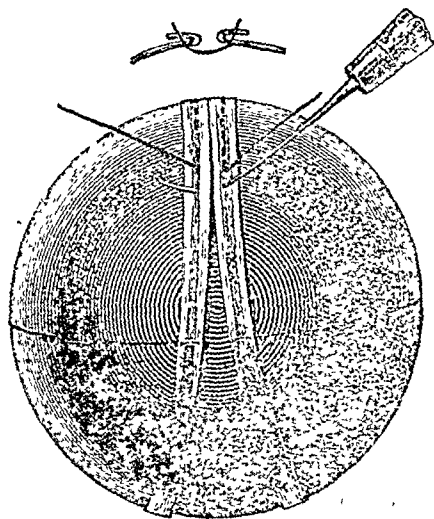


Fig. 3.

two, which makes a much better job and stronger, but more difficult to sew perhaps. The figure 3 will help to show how to do it. The stitches must be pulled up close; the leather will shrink in drying and make all tight. The seam can be flattened down with a hammer. Harness trimmed neatly with a sharp knife and flattened down with a hammer. Harness-makers' needles are needles without sharp points. The slightly bent ones are the best for sewing the leather on the ball. A small bent awl can be had at any leather cutter's, as well as hemp and wax to make the thread.

The hole in the leather is bored with the awl, and as it is drawn out one needle is passed through from the opposite side; and while one needle is in the hole the other must be passed through one needle, acting as a guide to the other.

It may appear difficult to hold the ball while sewing is taking place. The last illustration in this connection may help the reader to understand how it can

be done. A piece of wood, say a foot long, is screwed on the bench with a long screw. Having cut a hole in the centre not quite so large as the diameter of the ball, and with your foot in the strap or string, the ball can be held fast while it is being sewed, and easily turned round.

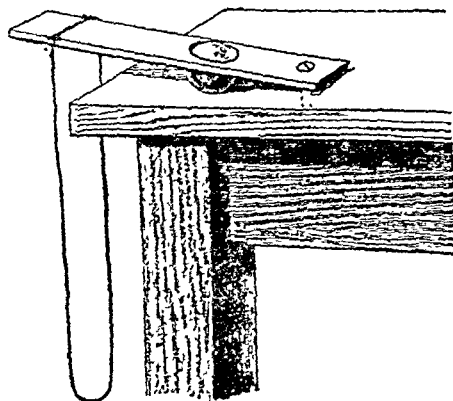


Fig. 4.

To some no doubt this may seem a long explanation of a single simple job. But we hope it may be of use to new industrialists who have scanty knowledge about the methods usually followed by the cricket ball makers.

NEW METHOD OF PRINTING TEXTILES.

THERE is one prominent feature about the indigosols, whether they be printed or dyed, and that is, the shades obtained are very brilliant, as compared with those of the ordinary vat dyestuffs. The production of the shades is extremely simple, and no special methods of manipulation are required. The process, described by Mr. W. Bennett in one of the issues of *THE DYER, CALICO PRINTER, BLEACHER, FINISHER AND TEXTILE REVIEW* is summarised here for the benefit of our readers. In this process the shades formed are fixed by steaming. Chlorate of soda is added to the printing paste along with, in most cases, thiocyanate of ammonia, and in the case of Indigosol Black IB, a further addition is made of Indigosol Developer D or GA. The following general recipe is appli-

cable, but the amounts are varied according to requirements:—

EXAMPLES OF PRINTING PASTES.

Indigosol Pink IR Extra	20 lbs.	—
Indigosol HB	—	35 lbs.
Glycerine, or Glycine A	25 lbs.	25 lbs.
Dissolving salt B	15 lbs.	15 lbs.
Water	13 gals.	12 gals.
Tragacanth—wheat starch		
Thickening	23 gals.	22 gals.
Ammonium Thiocyanate	15 lbs.	10 lbs.
Sodium chlorate	10 lbs.	7½ lbs.
Vanadate of Ammonia		
(1-1,000)	50 lbs.	50 lbs.
Ammonia, 20 per cent.	5 lbs.	5 lbs.

The whole is made up to a bulk of approximately 48 gallons.

In all cases of printing colour pastes there is a necessity for a thickening and reduction paste. A reduction paste either for the standard or for reducing purpose is made up as follows:—

REDUCTION PASTE.—(THICKENING).

- 35 gall. gum arabic solution (1-2).
- 12 gall. water.
- 5 lb. ammonium thiocyanate.
- 5 lbs. sodium chlorate.
- 2½ gall. vanadate of ammonia (1-1,000).

Total: Approx. 50 gall.

The above recipe applies to all the Indigosols, with the exception of Indigosol Green AB, for which the following special recipe is required, in which is incorporated a developer and considerably less chlorate:—

Reduction Paste for Indigosol Green AB.

- 35 gall. gum arabic solution (1-2).
- 11 gall. water.
- 15 lbs. indigosol developer D.
- 1½ lb. sodium chlorate.
- 2½ gall. vanadate of ammonia (1-1,000).

Total: Approx. 50 gall.

After printing, the goods are dried, preferably in the hot flue. The next operation is steaming in the rapid ager for a full 5 min. Then wash off the goods, first in cold, and then in warm water, extract and dry them.

Padding and Over or Cover Prints—One of the most popular styles is a light

ground shade with a cover printed effect. Owing to the ease with which they can be applied, the Indigosols are very suitable for this class of work, and the resulting ground shades are much brighter than those of the ordinary vat colours. In this respect the Indigosols are the more attractive and valuable. The process is the usual one of first padding the dry cloth with the selected Indigosol and then drying it, in the hot flue for preference. Without further treatment, the printing colour pastes are now applied, after which the goods are dried, then steamed for 5 min. in the rapid ager and finally washed and dried.

NEW PRINTING METHOD.

The amounts of Indigosol necessary will vary from 1.5 to 2.5 or more parts per 1,000 parts of pad liquor, according to depth of shade required.

Printing the Indigosols without Steaming.—This method, which has been put forward by the manufacturers of the Indigosols (Durand & Huguenin), is particularly useful in cotton printings. It is much simpler than the other methods and other advantages are that the usually necessary operations of ageing and steaming are entirely dispensed with, as is also the after-treatment consisting of developing in an oxidizing bath. This elimination of two operations means a considerable saving in time and labour, and less handling of the goods.

THE PRINCIPLE INVOLVED.

This comparatively new method is, however, not applicable to all the Indigosols, the following being excepted: Indigosol O, Indigosol OR, Indigosol Yellow HCG, Indigosol Violet AZB and Indigosol Green IB. All the rest are suitable for this process. The principle involved is that oxidation of the colour base is brought about by the use of copper-chloride, in the presence of glyezine (ethylene-dithiodiglycol).

The chief operations are three in number, namely: (1) padding; (2) printing; and (3) washing off. The last is very essential. The bleached cloth, in the dried state, is passed through the padding mangle, in which is the following pad liquor:—

- 15 lb. copper chloride.
- 46 gall. water.
- 1½ gall. tragacanth thickening (1—10).
- 10 lb. formic acid 85 per cent.

The padding mangle should have two nips, with the cloth passing through the liquor before each nip. This is to ensure perfect penetration of the fabric and to give an even pad. At the same time it helps to cover up any slight defects in cloth and mangle rollers which might be manifest with one nip. After the goods have passed through the liquor, they are immediately dried, preferably in the hot flue, cylinders should be avoided in every case. The material is now ready for printing.

Typical printing colour pastes are prepared from:—

- 20—30 lb. Indigosol (selected; powder form).
- 20—25 lb. glycine.
- 14—12½ gall. water.
- 27½—25 gall starch tragacanth thickening.
- 5—15 lb. lactic acid.

Make up the total volume to 50 gall.

When the colour is in the paste form, the amount of Indigosol to be added to replace the powder in the above is 40—60 lb. respectively.

It is further recommended as an advantage, to make an addition to the printing paste of ammonium chlorate, the amount of this being 1—100 of a solution strength of 20 deg. Tw.

The material is printed with the paste and then dried at a temperature of 60 to 70 deg. C. in the hot flue.

DANGER OF COPPER CHLORIDE.

It is important to note that copper chloride especially when chlorates are a constituent part of the applied mixing, has a very strong tendency to tender the cotton fibre when excessive heat is applied, and the slightest deviation from the correct procedure is liable to result in the whole fabric being ruined. On the other hand, there is really no danger whatever if the drying is done in the hot flue and at a temperature of 60 to 70 deg. C.

is not exceeded. Drying cylinders should never be used when copper chloride and chlorates of other bodies are in the same mixings.

It is not wise to allow the goods to lay about for long after printing either after padding, or printing especially. Immediately following the printing, the material is passed through a solution of sodium carbonate of a strength of 1 lb. per 20 gall. of liquor, or of the same volume. The whole is to be kept at the boil for 10 min. after which the goods are well washed off and dried.

The printing pastes described are not very stable, and may not be stored for more than 10 hours, after which they begin to "age" and the results from them are less favourable, with a gradual deterioration.

By carrying out the instructions given, one can obtain from the freshly prepared printing pastes results that admit of comparison with those obtained by the ordinary process of printing followed by steaming.

Printing Unions containing Acetate Rayon.—In the printing of union fabrics composed to cotton and acetate rayon or viscose and acetate, the Indigosols come as a long felt want, to use a hackneyed but useful phrase. When really fast colours are demanded we naturally turn to the vat dyestuffs. But as these colours are dependant upon the use of strong alkalis for the purpose of reduction and solution, they cannot be employed for acetate silk for the reason that this textile material is so readily "blinded." Several means have been adopted for replacing the strong caustic alkalis, and with a fair measure of success, for example, the use of potassium carbonate as a substitute and the addition to the printing pastes of thiocyanates, especially thiocyanate of lime. Other bodies have also been suggested, but in almost all cases, a high temperature is part of the process.

NO BLINDING IN DRY STEAM.

Though a good steaming is almost a necessity, the fact cannot be overlooked

that no matter what preventative is used there is always the danger of blinding. This is also the case when the steaming is prolonged, especially if the steam contains much moisture. On the other hand if the steam be practically dry, it does not lead to blinding to the same extent, and high temperatures may be used, even up to 100 deg. C. This principle of dry steam has quite recently been the subject of a patent, yet it should be mentioned that particulars of this dry steam method were published some four years ago by the water. Nowadays, a partial saponification of the acetate rayon, or a reduced lustre appears to satisfy, probably because hitherto it has not been possible to prevent delustering or saponification.

In printing with the Indigosols none of these disabilities arise, as both caustic alkalis and high temperatures in steaming are eliminated.

The following are examples of printing pastes which differ from the normal. They generally produce solid shades.

Indigosol Black IB on Cotton, or Viscose Acetate Rayon Unions:—

- 62½ lb. Indigosol Black IB is dissolved in
- 17 gall. of hot water and, if required, the addition of a little Glycine A, or Dissolving Salt B is made. This solution is now thickened with
- 25 gall. of Tragacanth (6-8 oz. per gall.) or an equal volume of gum Arabic (1-2), and
- 15 lb of sodium nitrite, and
- 2½ lb. ammonia, 25 per cent, is added.

This mixture is made up to a standard bulk of 48 gall. with water and tragacanth thickening.

Other shades are produced by using the foregoing recipe, but replacing the Indigosol Black IB with the following amounts of dyestuffs:—

- 30 lb. Indigosol Yellow HCG, or
- 35 lb. Indigosol Orange HR, or
- 25 lb. Indigosol O4B, or
- 25 lb. Indigosol Violet AZB, or
- 45 lb. Indigosol Red HR.

Compound mixings may be used where the individual colours agree, for example, olive green is made up with a combination of:—

- 15 lb. Indigosol Yellow HCG, and
15 lb. Indigosol AZG.

THE DEVELOPING BATH

After printing, the goods are given two passages through the ageing machine for 5 min. The alternative to this is steaming in the cottage apparatus for 15 min. It is not wise to store the material too long before developing. This is done by the continuous method, using a developing bath containing 30 parts of sulphuric acid of 168 deg. Tw., per 1,000 parts, at a temperature not exceeding 74 to 79 deg. C., for 2 to 4 min. The material is now washed off cold, and then given a short soaping at 60 to 70 deg. C. To complete the operations, a final rinse is given and the goods are then dried.

Printing Wool Unions with the Indigosols—The vat dyestuffs are rarely printed on wool or natural silk, the principal reason being the strong alkalis necessary in the printing paste. These substances, of course, readily tender the silk and woollen fibres. In exceptional circumstances, it may happen that the vat dyestuffs are required, in which case the alkali content is kept as low as possible, the printing paste being made up with potassium carbonate as the needful alkali, and the amount of this reduced to the minimum consistent with proper solution of the vat dye and fixation of the colour.

With the Indigosols, these difficulties do not arise, and they may be printed on any union material of which a constituent is wool or silk. In the case of a viscose-wool union, the material is first subjected to the usual chlorinating process, as in all cases of wool printing. There is no universal printing paste for this material, the composition of the paste differing slightly according to the colour. In the case of Indigosol Violet AZB, Indigosol Green IB and Indigosol Black IB, a developer is added to the paste in the following examples. For Indigosol Black IB, the chlorate of soda and the ammonium thiocyanate are left out and bromate of soda substituted.

Table 1.
Printing Paste for Wool-viscose Material
Recipes for Indigosol Violet AZB, Indigosol
Green IB and Indigosol Black IB.

	Violet AZB	Green IB	Black IB
	(in parts by wt)		
Indigosol violet AZB	60	—	—
Indigosol green IB	—	80	—
Indigosol black IB	—	—	100
Water	430	540	480
Indigosol developer			
GA	80	80	80
Dextrin	250	250	250
Ammonia 25 per cent	10	10	10
Ammonium thiocyanate	50	20	—
Sodium chlorate	70	20	—
Vanadate of ammonia (1—1,000)—	50	—	50
Sodium bromate	—	—	30

FINISHING THE PRINTS

The printed goods are run for 5 min in the ager preferably with moist steam, and then given a further steaming in the cottage apparatus for half an hour. All that is now required is a good rinsing, first in cold water, and then in warm water. Finally, the fabric is dried.

For the other colours in the series (recipes in Table 2), a developer is not necessary in the printing paste but an addition is made of glycerine or Glycine A.

After being printed with the above pastes, the material is finished, i.e., the ageing, steaming and washing is carried out as before described, and no other treatment is necessary.

Table 2.
Yellow Red Orange
HCR HR HR Blue Pink
(in parts)

	Yellow	Red	Orange	Blue	Pink
Indigosol yellow	60	—	—	—	—
Indigosol red	—	80	—	—	—
Indigosol orange	—	—	80	—	—
Indigosol HB	—	—	—	60	—
Indigosol pink	—	—	—	—	70
HC extra	—	—	—	—	70
Water	470	360	450	470	360
Glycerine or Glycine A	80	80	80	80	80
Dextrine	250	250	250	250	250
Ammonia 20 p.c.	10	10	10	10	10
Ammonium thiocyanate	30	50	30	30	50
Sodium chlorate	50	70	50	50	50
Vanadate of ammonia (1—1,000)—	50	100	50	50	100

HOW TO INVEST IN SHARES.

IT IS useless to disguise the fact that the subject of investment of money appears to the uninitiated to bristle with difficulties, but, with study, practice and the exercise of a little common sense, these difficulties are found to be less formidable than at first supposed.

The first consideration to an investor is a knowledge of the various forms of securities, stocks, railway and municipal debentures, shares of commercial undertakings with the amount of risk they carry. Government stocks and loans bear a fixed rate of interest and are the least speculative of all investments. The risk is small and the interest is also small as compared with those paid by certain commercial undertakings. The same may be said of the municipal and railway debentures as they are often guaranteed by the Government. A study of these forms of investment does not tax much labour and one can with ease get into the technics of Government stocks within a short period.

COMMERCIAL UNDERTAKING.

The greatest difficulty is, however, experienced in the selection of the commercial undertakings and those shares are of speculative nature. Dividends, high in amount, are recommended for a few years and the prices of the shares also go up when all on a sudden the undertaking collapses bringing down ruin upon its numerous shareholders. It is one thing to point to the great success which has been attained by various companies and the great appreciation in capital which, in consequence, must have been enjoyed by many fortune investors, but

quite another matter to place the investor in a position to acquire the knowledge and skill which will enable him to select for his investments companies which are likely to grow in strength and prosperity, and so afford good opportunities for the appreciation of his capital. It is however possible to do much to guide him in his selection, but, it is necessary, at the outset, to lay stress on the fact that to obtain good results time and study are essential. The following general guiding principles, in the selection of investments in dividend-paying concerns will be found useful.

POINTS FOR GUIDANCE.

1. Confine attention for the most part to companies in industries which are known to be in a prosperous condition, bearing in mind the fact that, even in industries which are temporarily depressed from one cause or another, companies with strong reserves are often in a very healthy state, and are able to give a good account of themselves.

2. Before deciding upon any investment carefully study recent balance sheets of the company in question and compare this with its previous balance sheets and study its measure of progress during the last few years.

3. Reject any investment, no matter how otherwise tempting it may appear unless examination of its balance sheets affords unmistakable proof by the amounts set aside for depreciation and reserve, that the management of the concern is conducted on sound and conservative lines.

4. Remember that companies in which the capital is so arranged that the ordinary or deferred shares have the benefit of a fair proportion of cheap capital in the form of preference shares and debentures are certain, other things being equal, to be the more prosperous and in a position to pay bigger dividends

ESSENTIALS IN SAFE INVESTMENT.

The above may be said to be the fundamental guiding principles which apply to investments in all commercial and industrial undertakings, irrespective of the particular business or industry in which the company in question is engaged. More than this, however, is essential to the making of a successful investment, by which is meant an investment likely not only to pay a good dividend, but to result in a substantial capital appreciation in the value of the shares over the period of a few years. Having selected a company which on the general principles above referred to, would appear to have the essential requirements of a good investment it is necessary to advance a step further and examine the prospectus of the company with reference to the particular industry in which it is engaged. The essentials necessary to a good investment in a store are totally different to those which apply to an investment in a bank or an insurance company or to an investment in a tea or rubber estate. It is necessary therefore for an investor to study in some little detail not only the general conditions of the particular industry in which the company he proposes to invest his money is engaged but the actual position of the company itself in relation to other companies in the industry in question and, unless he is prepared

to do this, it is quite impossible for him to form an opinion of any value on the relative intrinsic merits of any particular investment. He is therefore compelled to rely entirely on advice which may be given him—a position by no means satisfactory for an investor. He should not be at the mercy of the honesty or villainess of advisors if his investments are to prove satisfactory from pecuniary point of view. He should by all means possess a just appreciation of the special factors on which the individual merits of any particular concern is based so that he may be in a position to subject any advice he may receive to an informed and enlightened criticism.

The investor who confines his attention to the ordinary, or deferred shares as the case may be, of carefully selected concerns, purchased after the dividend-paying stage has been reached is most likely on the right way to make money. There is, however, the other side of the shield and it should not be minimised that money can also be lost quite easily in this class of share. At the same time, the point which it is desired to stress is that the intelligent investor is, for the most part in a position to avoid such losses or at any rate to greatly limit their amount, if he will take the trouble to regularly study the balance sheets of the companies in which he is interested, and keep himself in touch with the general trend of affairs in the particular industries in which the companies in question are engaged.

FAILURES DUE TO FRAUD.

Failures or partial failures of companies may be classed under three distinct heads; failures due to fraud, failures

due to indifferent management and failures due to economic causes such as depressed trade, disorganisation due to strikes, failure of production in the case of mines, changes in fashion, legislative action, etc.

Against failures due to fraud it is practically impossible for the investor to safeguard himself. The disclosures of fraud, when eventually brought to light, usually occur so suddenly, that the shares in the company in question are at once unsaleable so that it is quite impossible for a shareholder to cut his loss, however anxious he may be to do so, before the actual collapse of the company is confirmed.

OVERHAULING THE INVESTMENT.

Failures, whether due to bad management or to economic changes leading to loss of earning power, and in consequence to a set-back in the prosperity of a company, unlike failures due to fraud, are for the most part brought about gradually, and are reflected in the balance sheets of the company concerned, as well as in the price of the shares. The shareholder is however, behind the scene and is ignorant of the internal working of the concern, and in most cases it is not easy for him to distinguish between the two causes of failure. Incompetent directors very naturally lay the blame of failure, on economic causes when bad management and the want of foresight more truly represent the cause of failure. But the actual cause of failure in such cases, is not of any very great importance to the investor. It is true that inefficient management is susceptible to remedies, while dwindling profits, due to economic causes over which the

management can frequently exercise little control are of a more permanent nature in their effects. A company may of course have large reserves, and these reserves may carry the concern through a period of depression or help it to reorganise its business on a more paying basis with possibly no very great hardship to shareholders, except in the form of lessened dividends for some period of time. The question, however, naturally arises in all these cases whether in the face of dwindling profits, and a decline in the price of the shares in consequence, it would not be wiser for the investor at once to face the loss and sell out and look for some other investment with more assured prospects. There is, it may be added, a natural reluctance among investors to sell shares at a loss, and incur the expense, in addition, of reinvesting the proceeds; but it is far better to sell even at a substantial loss than to continue to hold shares which owing to the particular position of the company in question, are steadily falling in price. It is here that the investor who periodically overhauls his investments, examines balance sheets, and keeps himself generally informed of the prospects of the concerns in which he has invested his money, scores as against the investor who is too apathetic to take any intelligent interest in his investments. The former owing to the care and attention which he devotes to his investments, is usually in a position to forecast a declining prosperity and so is able to sell his shares at no very great loss while the latter only works up to the seriousness of the position when the decline in the price of the shares has gone so far that he has not the courage to fear the loss.

IN THE INSURANCE FIELD.

BY OUR INSURANCE COMMISSIONER.

Doing Without Foreign Companies.

In the field of life insurance in Europe and America, the dominant tendency is towards dispensing with the foreign companies. There are few Britishers now-a-days who insure their lives with non-British companies, few Americans who insure their lives with non-American companies and few Germans that insure their lives with non-German companies. This tendency is nothing but a manifestation of the predominantly nationalistic outlook of the countries in the field of economics, aiming at "autarchy" or economic self-sufficiency. In some countries again, foreign insurance enterprise has been prohibited by law, e.g., Russia. In some countries, various disabilities have been imposed by law on insurance companies owing their origin to a foreign land, e.g., Italy and Germany. Above all, the determination of the people to insure with none other than indigenous concerns has necessitated the withdrawal of the operations of several important and world renowned offices, although law permits such operations; for example, the Metropolitan Life of New York, one of the greatest life offices of the world, has closed down its London Office on account of the fact that it did "no longer pay" to maintain an office in London. In Russia, there is not a single foreign company working, since the total insurance industry is the monopoly of the State. There is no profiteering, or scope for private enterprise in the field of in-

surance in Russia. In Italy, the conduct of the foreign companies is as much regulated by law as that of the indigenous companies. Under the present organisation of economic institutions in Italy, the Co-operative system as it is called, there can be no economic activity so vitally affecting national welfare as Insurance that may escape the supervision of the State. Although insurance is not a State monopoly in Italy as tobacco, yet the activities as well as accounts of the insurance offices are scrutinised by the State. These institutions are known as *parastatal*, as they do not come under the direct control and government of the State. Foreign companies are necessarily at a disadvantage.

India Can Hold Her Own.

It would undoubtedly appear to all that in the field of life insurance alone, a country can do without foreign companies altogether. Comparisons may always be drawn between offices of domestic and foreign origin in regard to their relative security and benefits, but the differences are so little among the better class offices that they can be easily ignored. For, the premium rates, policy conditions and the aspect of security of all first class companies, whether indigenous or foreign, must tend to be identical on account of the existence of competition in the field. It is therefore a pity that a number of educated and rich Indians insure their lives with foreign companies. At a time

SMALL TRADES & RECIPES

Laundry Blue Tablets.

Ultramarine	6 oz.
Sodium carbonate	4 oz.
Glucose	1 oz.

Water, a sufficient quantity.
Make a thick paste, roll into sheets, and cut into tablets.

Sewing Machine Oil.

Pale Oil of almonds	9 oz.
Rectified benzoline	3 oz.
Oil of lavender	1 oz.
Mix.	

Mosquito Oil.

The following mixture is very effective in keeping off mosquitoes:—

Olive oil	3 parts.
Oil of pennyroyal	2 parts.
Glycerin	1 part.
Ammonia	1 part.

Mix. To be well shaken before applying to the face and hands. Avoid getting the mixture into the eyes.

Oxygenated Tooth Powder.

Precipitated chalk	1 lb.
Magnesium peroxide	2 oz.
Borax	1 oz.
Thymol	20 gr.
Menthol	20 gr.
Saccharin	6 gr.
Soap powder	$\frac{1}{2}$ oz.

Mix thoroughly by passing through sieves several times.

Bottle Cleaning Compound.

Bottles and other glassware may be cleaned thoroughly with a solution made by dissolving the following dry chemical mixture in hot water as needed:

Sodium metasilicate	1 part.
Soda ash	2 parts.
Trisodium phosphate	$2\frac{1}{2}$ parts.

The solution made by dissolving this cleaning powder in water is very effective and may be used for a large variety of cleaning operation.

Solution To Prevent Photographs from Curling.

To prevent photographic prints from curling in cold, dry weather, brush over the back of the paper a solution consisting of gelatine 1 oz., and water 10 oz. After the prints have been brushed with the solution, place them under some heavy books or other weights to flatten out.

Adhesive for Celluloid to Stick to Metal or Wood.

A strong adhesive for fastening celluloid to wood or metal is made by dissolving shellac, 2 oz., in methylated spirit 4 oz., and adding spirits of camphor 3 oz., after which the mixture is allowed to stand overnight in a tightly closed container. If all the shellac has not been dissolved, the mixture should be cautiously warmed over a water bath away from an open flame while stirring.

Coloured Pencils for Writing on Glass.

Coloured pencils for writing on glass are easily made with the following mixtures, which are cast in a mould: To make black pencils, mix lampblack, 10 parts, white wax, 40 parts, and tallow, 10 parts. For white pencils, mix white lead, 40 parts, white wax 20 parts, and tallow, 10 parts. If Berlin blue, 10 parts, is substituted for the white lead in the last preparation, the pencils will be blue. Or, they may be made yellow by using chrome yellow, 10 parts, instead of the lead. To make dark blue pencils, mix Berlin blue, 15 parts, lampblack, 1 part, gum arabic 5 parts, and tallow, 10 parts. In mixing the preparations, first melt the wax and tallow together and then add the pigment. A mould for casting the pencils is made from a soft pine block, which has several $\frac{1}{4}$ in. holes drilled in it. The block is then sawed in half and fastened together with brads so that it can be taken apart to remove the pen-

India's Industrial Progress.

Handloom Industry in Bengal.

The Government of India has granted Rs. 35,000 for the current year and Rs. 80,000 for the next year for the improvement of the handloom industry in Bengal. The grants are the largest ever made to any province in India for such purpose. Following upon the recommendations of the Industrial Commission of 1914-16, an attempt was made by the Government of Bengal to organise the handloom industry on co-operative lines. Its activities were mainly confined to the maintenance of a sale depot at Calcutta, to which government in the initial stages made a subsidy of Rs. 12,000 a year. In the first few years the stuff turned out by the societies found ready sale. But with the increase of foreign competition and the growth of power-using factory industry in India the handloom industry showed signs of decay. The main cause for deterioration of the handloom industry generally and of the business of the co-operative societies in particular was that the goods produced by handlooms compared unfavourably with mill-made goods in design, texture and finish as well as in price. The Government of Bengal has now formulated a scheme with the grants of the Government of India for the resuscitation of the handloom industry in the province. In preparing the scheme the government has taken into account the difficulties which have retarded the progress of the handloom industry. The scheme is to strengthen and improve the structure of co-operative industrial unions of weavers which had already been built up by the Co-operative Department.

Mango Pulp.

The Annual Report of the Department of Industries, Bombay Presidency, for the year 1933-34 states:—Mango is an important fruit of the Presidency. So far it is consumed mostly as such. There are some establishments which dry the pulp in the form of loose sticky sheets. But so far no attempts have been made to dry the mango pulp on the same lines as the drying of milk in the form of milk powder. Successful drying of pulp will make a good industry from those districts where mangoes are available in large quantities especially at Ratnagiri and Karwar Districts where mangoes after the steamer services are closed cannot be exported to mango markets. This Department undertook an investigation in this direction and found that it was possible to produce a friable powder by drying mango pulp under definite conditions of temperature and pressure. The powder was prepared on laboratory scale and was shown to various merchants and authorities on mango. They all said that if mango powder is available in this form it will find a good market. The method of drying mango pulp was demonstrated at the H. O. H. Fete. Several mango producers in Ratnagiri District were interested in the demonstration and have approached this Department for helping them in putting up a small plant for the production of mango powder. It has been decided to carry out investigations on a bigger scale to work out the cost and other data, etc., which will enable the Department to design a suitable plant for commercial exploitation.

Scientific & Technical Topics.

Advertising Signs.

The discharge tubes and for advertising signs are a development of the old Geissler and Crooks tubes in which various beautiful effects were produced when evacuated tubes filled with certain gases were excited by an induction coil. Forty years ago, the gases used were mostly nitrogen and carbon dioxide, and these required continual replenishing. It was only when the rare gases argon, neon, helium, etc., were experimented with that it was found possible to obtain a reasonably permanent luminous discharge. Neon at a suitable pressure gives more visible light and has a lower electrical resistance than the permanent gases, hence a greater length of tube can be operated for a given voltage. Neon has a cheerful red glow, argon gives a faint lavender colour and helium has a whitish glow. Combinations of various gases and vapours with neon and the use of coloured glass tubes have enabled many striking and pleasing coloured effects to be obtained.

Filtering Air with Electricity.

Ordinary filters will remove coarse dust, but the finer particles creep through nearly all air-filters adapted to home use. Engineers of the Westinghouse Electric and Manufacturing Company recently have succeeded experimentally in filtering air with the aid of a powerful electrical field. This charges the tiny particles, which then are passed through a collecting-screen of opposite charge. Even particles as small as those in cigarette smoke are attracted to the metal walls, where a thin film of oil traps and holds them.

Machine Solves Problems in Higher Mathematics.

A differential analyser, popularly known as the "mechanical brain," will soon be completed by C. W. A. workers at the Moore School of Electrical Engi-

neering, University of Pennsylvania. The machine weighs six tons and was designed by Oscar Schuck to facilitate the solving of problems in higher mathematics. It will complete in fifteen minutes calculations that would require four months' work by five mathematical technicians. Below—Geologic clock in the St. Paul Institute, St. Paul, Minn. on which the duration of life-ages of the earth's history may be seen at a glance. Less than a third of a minute on this clock suffices for the whole age of man on earth. Its timing varies from 500 to 2,000 million years.

Solid Alcohol Fuel.

An absolute monohydric alcohol, such as ethyl alcohol, mixed with nitrocellulose forms the basis of a recently patented method of preparing a solid alcohol fuel.

The nitrocellulose, insoluble in the absolute alcohol at ordinary temperatures becomes soluble when the alcohol is chilled to low temperatures. In this process a mixture of absolute alcohol and nitrocellulose is chilled to about—20 deg. C. and a similar amount of aqueous alcohol, chilled approximately to the same temperature, is added. The mixture solidifies when allowed to warm to atmospheric temperatures.

Electric Cow-Punching.

Germans have invented an electrical device to do away with the goad and the whip in driving cows. It consists of two small knobs that are set vibrating when pressed. If a cow moves too slowly the herdsman needs only to touch the cow's hide with the device; a tickling sensation will send the animal scampering but unhurt. The Kindness to Animals League is promoting the use of the device with a new slogan. "Don't beat your cow. Tickle it!"

Formulas, Processes & Answers.

Cleaning Precious Stones.

2343 V. P. M. O. M., Madras—Wants to know a process of cleaning precious stones.

To clean precious stones the following mixtures will produce good result when rubbed on the surface of stones: wet, precipitated sulphur, moistened with alcohol. A mixture of 1 part of washed flowers of sulphur and 2 parts of fine washed tripoli powder is also adapted for this purpose. The mixture, by means of a soft leather, is rubbed on the precious stones. Places that are not accessible by means of chamois can be treated with a small brush, a second brush being employed to remove the dust. If the gems are set in silver the sulphur must be omitted.

Lozenge Drops.

2776 E. A. K., Mombasa—Wishes to have processes for making lozenge drops, balls.

When working lozenge-drops on a small scale, without any appliances, the sugar syrup thickly boiled may be allowed to fall drop by drop on a tin plate covered with a thick layer of starch by holding the pan in the left hand and a small rod of iron or copper in the right. In two or three hours the drops become hard and brittle, and are collected and at once put into bottles or tins.

Lozenge Balls.

In making lozenge balls the sugar boiled with small quantity of water so

as to form a plastic lump on cooling and is well kneaded by hand to make the colour quite uniform. Each of the plastic lumps is then drawn out into a thick thread by an operator and a suitable length is cut out of this by a pair of sharp scissors. The length is then made quite circular by rolling on the second stone table slightly oiled. It is then cut into small bits of uniform size with the help of a pair of sharp scissors. As soon as they drop on the table in the shape of small cylinders, another operator begins to roll them on the table with the palm of the hand and transfers them to the next operator who is also entrusted with the rolling of the imperfectly rolled balls. He also transfers the balls to the next man as he receives a fresh supply to be rolled, and so on. The pieces generally pass from five to six hands before they can be expected to be quite spherical in shape.

The first operator thus goes on with rolling out the lumps into circular threads and cutting out the rolls into small cylinders in the above manner while the balls are rolled by a band of workers all arranged in a line along the table.

When the balls are thus rolled, they are allowed to cool. For this purpose they are spread on the big tables with borders all round, and there too they are rolled by hand. When cold they are passed through a sieve and bottled up.

Sugar Coated Balls.

The lozenge balls may be further coated with the fine sugar. For this purpose the balls are slightly moistened by handling them with palms moistened with water or some suitable flavour dilute with water. In the meantime sugar is spread on a tin-plated table which can be given a rocking motion by titling the sides up. The moistened balls are poured on the layer of sugar and the rocking motion of the table causes the lozenge balls to roll on the layer of sugar and thus assimilate a coating of sugar all round. The object can be made conveniently achieved by spreading the sugar in a layer on a clean piece of canvas or hessian and putting the balls to be sugar-coated well scattered on the sugar. The corners of the textile can be raised up so that the balls may be easily made to roll on the layer of sugar. The balls thus coated with sugar are very much relished and fetch higher prices.

Silvering Mirror.

2959 M. T., Bhimavaram—Wants processess and formulas for silvering mirror and scented cards.

The process of depositing metallic silver upon glass from a soluble salt of silver is called silvering the mirror. This is done in the following way:—

(1) A solution of double tartrate of sodium and potassium is prepared by dissolving 12 grains of the tartrate in 12 oz. of distilled water.

(2) A solution of silver nitrate is prepared by dissolving 16 grains of nitrate of silver in 1 oz. of water. The solution is boiled for several minutes. Then ammonia is added to the solution.

A brown precipitate is formed. A little more ammonia is then to be added. The precipitate dissolves. Excess of ammonia must be avoided.

The piece of glass on which silver is to be deposited is carefully cleaned with soda and well rinsed with distilled water. Equal portions of the solutions (1) and (2) are mixed together. Hold the glass piece on the top of the mixture with its face touching its surface. Silver thus deposits on that face of the glass piece which touches the mixture. The deposition of silver will appear dark-coloured. After rubbing the surface it will show its own brightness. A gentle heat facilitates the depositions. Skill in the art of silvering can be learnt by practice only.

Scented Cards.

Mix thoroughly coumarin 10 gr.; heliotropin 10 gr.; ionone 10 mins; hyacinthine 5 mins; essence of musk 30 mins; otto of rose 5 mins; rectified spirit 1 fl. oz. Then soak a piece of blotting paper in the mixture. The cards to be scented are put up in a closed box along with blotting paper for a day or so. The cards will imbibe the scent.

Tile Making.

3099 T. D., Ramavav—Desires to learn the process of making tiles.

Tiles are manufactured in a similar manner to bricks, the principal difference being that as tiles are thinner, more care must be employed in the manufacture, and the clay must be stronger and purer. There are three classes of tiles—viz; paving or flooring tiles, roofing tiles, and drain tiles.

Paving & Encaustic Tiles.

Paving tiles are moulded in a similar manner to bricks, and when half dry, are dressed by hand; then burnt in kilns.

Encaustic tiles are used for the flooring of churches, halls, passages, etc., and are made smaller and of a finer quality than ordinary flooring tiles. They are made in various colours, and laid in ornamental patterns—some have flowers, figures, and ornamental patterns painted on the surface, and burnt in; while in the richer kinds the surface is stamped or pressed into ornamental forms, and the indentations filled in with different coloured clays in a liquid state, and the whole burnt in.

These tiles are manufactured in Staffordshire, Worcestershire, and other parts of England. In most cases the clay for the tiles of plain colours, such as red or buff, is found on the site; while for other colours the clays are brought from another part of the country, or various stains may be mixed with the clay to colour it—thus the addition of manganese gives black, and of coal blue.

The plain coloured tiles are made from dry clay, pressed in a very powerful press, from whence they are dried and fired. Surface ornamented tiles are made from plain tiles, the pattern being painted on, and fired when dry.

The encaustic tiles are made from a much finer kind of clay, which has been washed, strained, and boiled. About half the thickness of the tile is formed of this clay in a metal mould, in which it is pressed to receive the pattern, or indentation on the face; the remaining half of the mould at the back is then filled with

a coarser clay, and the whole is then pressed to receive the proper amount of solidity. The tile is then taken from the press, and the various indentations filled with different coloured clays to form the pattern, and after remaining a few days to stiffen, the surface is scraped level, which brings out the pattern; it is then dried and fired.

Should the surface or any portion of it require to be glazed, the glaze is next applied in a liquid state and burnt in.

The clays for encaustic tiles require very careful selection and manufacture, as if there is any unequal shrinking in drying or burning the face of the tile will be cracked.

Roofing Tiles.

The clay for roofing tiles, after passing through the pug mill, except it be very pure, is cut into slices, to remove any stones that may be in it. Plain tiles are made in a mould, with either one or two nibs or holes on the top, to hang them on the laths of the roof. Pantiles are moulded flat, with one rib on the top; they are then laid on the wash-off frame, and moulded to the curved shape on a block of suitable form; then laid in the blocks (which are wooden shelves about 4 in. apart, running the full length of shed) till half dry; then laid on the thwacking frame and beaten, to correct any irregularity in drying, and the edges trimmed with a knife; then replaced in the blocks till ready for the kiln; they are then piled in the kiln on their ends, and burnt in the same manner as bricks. Hip, ridge, and valley tiles, are made in moulds.

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LEARN TO ORGANISE YOUR BUSINESS FROM

THEORY AND PRACTICE OF

COMMERCE AND BUSINESS ORGANIZATION

BY PROF. J. C. MITRA, F.S.S. (LONDON.), F.R. E.S.

WITH A FOREWORD BY SIR R. N. MOOKHERJEE, K.C.I.E., K.C.V.O., D.Sc., F.A.S.B., M.L.E. (INDO.)

The man who soon will be in a much better position than he occupies to-day is the man who is devoting some of his spare time to commercial study now. He knows what hidden opportunities are revealed to strengthen his earning ability inspite of the market.

The momentous requirements of Businessmen and Commercial students have been anticipated and a practical applications of the tried theories of commerce and business has been indicated. A descriptive treatment has been given to every topic that appertains to commerce and industry just to the point.

Besides an exhaustive index for facility of reference, an appendix is being added giving a glossary of Commercial terms and a list of abbreviations of commercial words and phrases.

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Drain Tiles.

These are tubes 12 in. long and from 2 in. bore upwards; they are used for agricultural drains, and are sometimes made by hand, but generally in a machine worked either by hand or steam power. The clay is forced through a die in the end of a box, and the tiles cut off with a wire, dried, and burnt.

Candied or Crystallised Eggs.

3343 U. S. C. W., Coimbatore—Wants process of making candied eggs.

Boil the syrup to 37° Beaume for the small
 " " 37½° " medium
 " " 38° " large

Take fine loaf sugar, and melt with the least possible quantity of water, and blue syrup for the white confection; take starch trays suitable for the size of egg to be printed. The starch must be dry and warm. Print with great care by means of a set of very dry plaster moulds, and take care in pouring out with the hand-dropper that the syrup does not touch the sides of the impression or mould; it would destroy the shape. Fill the moulds well with syrup and dust over with starch. Do not shake the trays after they are printed. Do the filling on the spot. When one row of trays is filled, put another row on top of the first, and so on. The room should be kept at 86°F (30°C) in winter during the 12 hours that the eggs require for setting. Afterwards, remove them from the trays with great care and let them drip, piercing the crust on top and inclining them on the grids arranged for this purpose. Let them drip for 6 hours and then trim, without waiting for them to be too dry, so as to prevent breaking. Afterwards,

let them go to the decorators who will ornament them. All kinds of fancy goods, large and small, are made in this style—large decorated objects, small transparent boxes, closing very well and strong enough to hold about ¼ lb. of small bon-bons.

Gilding by Dipping.

3415 A. C. J., Raipur—Desires to learn the process of gilding articles by dipping process.

(1) For this purpose the following solution is prepared. A strong solution of chloride of gold is first obtained, to which acid carbonate of potash is added in the proportion of 1 part of gold, in the form of chloride, to 31 parts of the acid carbonate; to this mixture is added 30 parts more of the latter salt previously dissolved in 200 parts of water. The mixture is then boiled for two hours, during which period the solution, at first yellow assumes a green colour, when it is complete. To apply the above solution the metal articles, of brass or copper, are first well cleaned and then immersed in the solution which must be hot, for about half a minute.

It will be seen from the above that articles of steel, silver, copper, and some other of the baser metals, may be gilt by simply immersing them in a weak solution of the chloride of gold. Another method is described below.

(2) Chloride of gold is soluble in alcohol and in ether. The latter solution may be obtained by agitating a solution of gold with ether, after which the mixture separates into two portions the upper stratum, which is of a yellow colour is an ethereal solution of chloride

of gold, while the lower stratum is merely water and a little hydro-chloric acid. After being applied the ether speedily evaporates leaving a film of gold upon the object.

Petrol from Coal.

3497 T. G. S., Lucknow—Desires to be enlightened with the process of manufacturing petrol from coal.

Since all processes for manufacturing petrol from coal have been covered with patent, no details can be obtained. The general procedure followed by most manufacturers is this:—

Coal is first reduced to small pieces and then they are sprinkled with coal tar and made into small bricks or balls. These are then packed in a cylinder and charged in presence of a catalytic agent with nascent hydrogen prepared by passing steam over red hot iron particles packed in a suitable iron tube. Coal readily takes up hydrogen with the formation of an inflammable liquid, which is condensed and collected in suitable vessel away from fire.

Laxative Tablets.

3787 G. N. M., Karachi—Desires to have prescriptions for laxative tablets and purgative pills:—

Extract colocynth Co.	1 gr.
Extract Jalapæ	$\frac{1}{2}$ gr.
Resin podophylli	$\frac{1}{4}$ gr.
Leptandrine	$\frac{1}{2}$ gr.
Extract hyoscyami	$\frac{1}{4}$ gr.
Oil menth pip.	q.s.
Mass for one tablet.	

Purgative Pills.

Aloes	45 gr.
Powdered rhubarb	22 gr.

Make into 50 pills with syrup of orange.

Bevelling Edges of Glass.

3815 N. N. D., Calcutta—Wants to learn the processes of bevelling edges of glass, etc.

Bevelling glass is carried out on special grinding and polishing machines, and a great variety of these are in use at the present time. The process consists in grinding off the corners of the sheet of glass and replacing the rough perpendicular edge left by the cutting diamond by a smooth polished slope running down from the front surface to the lower edge at an angle of from 45° to 60° . Since only relatively small quantities of glass have to be removed, small grinding rubbers only are used, and in some of the latest machines these take the form of rapidly-revolving emery or carborundum wheels. These grinding wheels have proved so successful in grinding even the hardest metals that it is surprising to find their use in the glass industry almost entirely restricted to the "cutting" of the better kinds of flint and "crystal" glass for table ware or other ornamental purposes. The reason probably lies in the fact that the use of such grinding wheels results in the generation of a very considerable amount of local heat, this effect being intensified on account of the low heat-conducting power of glass. If a piece of glass be held even lightly against a rapidly-revolving emery wheel it will be seen that the part in contact with the wheel is visibly red-hot. This local heating is liable to lead to chipping and cracking of the glass, and these are the

troubles actually experienced when emery or carborundum grinding is attempted on larger pieces of glass. In the case of at least one modern bevel-grinding machine, however, it is claimed that the injurious effects of local heating are avoided by carrying out the entire operation under water.

Polishing Mediums for Glass.

There are many, but one commonly used consists of rouge and pitch. The cleanest and quickest is tripoli powder and paper.

Gilding Glass.

2332 B. P. U., Agra—Wants to know a process of gilding on glass.

It often happens when the varnish is but indifferent, that by repeated washing the gold wears off; on this account the practice of burning it is sometimes had recourse to. For this purpose some gold powder is ground with borax, and in this state applied to the clean surface of the glass by a camel-hair pencil; when quite dry, the glass is put into a stove heated about the temperature of an annealing oven; the gum burns off, and the borax, by vitrifying, cements the gold with great firmness to the glass; after which it may be burnished. The gilding upon procelain is in like manner fixed by heat and the use of borax

Gilding Glass Bangles.

Glass bangles are gilded by blending powdered gold with gum water and a little borax, and applying the mixture by means of a camel-hair pencil. Gold powder required for the purpose is prepared by rubbing down gold leaf with

a little honey or gum water in a porcelain dish until the gold is completely transformed into powder, after which the honey or gum is washed away. The process may be repeated three or four times to obtain the desired effect. The painted bangles are then heated in an oven or furnace, by which means the gum is burnt, and the borax, vitrifying, cements the gold to the surface.

Peppermint Tablets.

290 S. I. C. W., Vaniyambadi—Wishes to have formula for preparing peppermint tablets.

White stearine 10 parts.

Alcohol 45 "

Mix thoroughly and dissolve.

Gelatine 3 parts.

Hot water. 50 "

Dissolve these, and add with the alcohol stearine solution.

Icing sugar 1000 parts.

Rub the paste through a fine sieve, and dry by exposing to warm air. Sift again and add:—

Peppermint oil 3 parts.

Keep the mass in well-fitting tins preferably for 24 hours to enable the peppermint to permeate thoroughly.

Sandal Oil.

3482 N. M. P., Bombay—Wishes to know the process of making sandal oil.

To manufacture sandal oil, the wood (San talum album) is first reduced to powder, about 40 to 60 lbs. of which are soaked in clean water for 48 hours, then placed in a copper still and is distilled. The water, carrying the oil evaporates and is condensed in the usual way, when, on cooling, the oil floats on the surface

and can be collected. It is then refined in various ways—filtered, or kept for a year until the sediment of impurities has settled at the bottom, etc. It is believed that the water has an important function to perform, since certain waters are superior to others. The yield is about $2\frac{1}{2}$ to 3 seers of oil to one maund of wood. The oil that comes off first from the still is the best quality. The following rules should be observed to get a better yield:—(1) the heat must be uniform; (2) the receivers must be removed directly they are full; (3) cleanliness is essential. If the tinning of the interior of the still is worn out, the oil gets greenish—colour from copper; (4) all joints must be steam-proof.

Dye Soap.

3498 S. N. M. Karachi—Wants to know the methods of preparing dyes soap, hair dye, etc.

To prepare dye soap take 1 lb. of common white or yellow soap, mix it with aniline colour 1 dram, and dissolve it in 2 oz. of gin and 2 oz. of water. Then work up the mass in a clear paste and mould it to the desired shape with stamps on. When the soap is required for dyeing purpose, take a sufficient quantity of this soap and dissolve it in warm water. Then dip the cloth to be dyed and keep it in the solution for ten minutes and then take out, rinse and dry in the air.

Hair Dye.

The following hair dye consists of two liquids. It being harmless is largely used.

A. Prepare 3% solution of hydrogen peroxide.

B. Metol	10 parts.
Amidophenol hydrochlorate	3 "
Monamidophenylamin	6 "
Alcohol	500 "
Sodium sulphite	5 "

Dissolve the sodium sulphite in alcohol and then add the other ingredients and stir until dissolved. It is then kept in a stoppered bottle. To dye one's hair, mix equal parts of (A) and (B) and apply to the hair with a comb having fine teeth; but before this the hair should be thoroughly washed with soap to remove oil, grease, etc.

Disinfecting Fluid.

Rosin powder	85 parts.
Caustic soda lye 36°Be	56 "
Castor oil	20 "
Creosote	15 "

Melt the rosin, add the castor oil and when thoroughly incorporated and while the mixture is still warm add the caustic soda lye and boil till the whole is saponified. Add a quantity of water from time to time if required. Lastly dissolve the soap thus formed with 3 to 4 times its volume and allow to cool.

When nearly cold add the creosote and stir. This gives the disinfecting fluid of good quality.

The object of using castor oil is to give whiteness to the fluid when mixed with water; the product otherwise should be brown. A mixture of caustic soda and potash is also used as an easier mixing product. Naphthaline in cresol and other coal-tar bases for disinfectants is the most frequent cause of this insolubi-

lity. A good way to get rid of it is to allow the saponified cresol to stand for about three months, during which the naphthaline crystallises out, and the fluid should be decanted from it.

Distilled Water.

Distilled water is usually prepared by distilling ordinary water with suitable precautions. For this purpose, take a tinned copper boiler furnished with a special still head and with a serpentine condenser of block tin. Pour the water into the boiler and heat to boiling. The steam issuing out of the boiler is passed through the condenser which is kept cool, whereby the steam is reconverted to water and collected in receiver. Care is necessary that the water may not boil violently, otherwise impurities will make their way along with steam. Reject the first portion of the distillate, which contains carbon dioxide and ammonium carbonate, the presence of which are recognised by the turbidity they produce in a solution of lead acetate. If the water contains magnesium chloride, add a little lime before distillation to prevent the hydrochloric acid from distilling. In this case, also reject the first portion of the distillate because it contains ammonia from the ammoniacal salts: the remainder of the distillate is pure water. It is, however, necessary to leave the last portion of the water undistilled, because certain organic substances commence to decompose, yielding impure distilled water.

Washing Soap.

3538 B. S. R., Ghazipur—Desires to know a formula for manufacturing washing soap.

Mahua oil	27	seers.
Sesame oil	12	"
Caustic soda 98 %	7½	"
Water for soda	40	"
Silicate of soda	10	"
Water for silicate	10	"

Prepare the caustic soda lye. Heat the oils in a suitable iron pan. When a cracking sound is perceived on addition of a few drops of water pour down 30 seers of lye. The fire is then withdrawn and when the mass gives out no more vapour pour down the remaining lye and again boil for 2 hours. When the soap thickens remove the fire, and add the hot silicate solution to the hot soap stock and mix vigorously. Finally put into frames.

Cement for Rubber Shoes & Boots.

3660 M. P. G., Shikohabad—Desires to know a formula for preparing cement for rubber shoes and boots.

A. Caoutchouc	10	parts.
Chloroform	280	"
B. Caoutchouc	10	parts.
Rosin	4	"
Gum turpentine	2	"
Oil of turpentine	40	"

To prepare solution (A) allow the caoutchouc to dissolve in the chloroform. For making solution (B) cut the caoutchouc into small pieces and melted with the rosin. Then add the turpentine and finally dissolve the mass in the oil of turpentine. Mix both the solutions.

READER'S BUSINESS PROBLEMS

[Reader's business problems will be discussed in these pages. We invite the reader to write us his difficulties. As the department is in charge of an experienced businessman who is specially adept in dealing with such problems and to whom experiences of a large number of successful business men are available, his replies will lead the enquirer to a successful career. These replies will be published in the paper only and cannot be communicated by post.]

Prosperity of the Small Trader.

3572 M. C. H., Calcutta—I wish to start a small shop. I shall be glad if you please ventilate through the column of your journal secrets of success in such a business.

I do not know of any way to make all small traders successful. There are far too many of them. But I know many small traders whose shops are busy—who are making a good living and putting money in the bank. It is possible for a small trader to hold his own, and to increase his trade even against the competition of multiple shops. A small trader cannot compete with big organisations if he sells on price. He cannot buy his goods as efficiently as they do. They can place enormous orders. You should not be fool yourself in this matter. If you slash your prices below the profit level, you will sooner or later close the shop.

The big organisation has the advantage when it comes to buying. But the smaller trader has some advantages too. He has a lower percentage of expenses. If he is very competent and his good helpers, this will balance his disadvantage in buying.

You can hold your customers by giving them more personal attention. You can call them by name. You can learn their wishes. If you are in a good neighbourhood, you can stock a higher quality

of goods. You can sell on quality, not price. If you are in a poor neighbourhood you can make your shop the most friendly place in your street. Your greatest asset is friendliness and likeability. If you are aloof and if your shop assistants are indifferent and unsociable you have no chance, in my opinion to make your shop pay. In the neighbourhood of my residence there is a tiny shop owned by a stationer. It holds only 7 or 8 customers at a time. It is often full. It is hardly ever empty. I often go to this shop in the evening and find the stationer and his assistants very busy selling goods. Why? Because they are friendly people. They are very popular in the neighbourhood. His shop is a little gold mine. It makes more profits than many shops three or four times larger.

You must get this fact into your head—that it is not the size of the shop that counts. It is the way that the customers are treated. In a small shop there must be better service. There must be personal attention. People go to the shop they like best, whether it is small or big. A small trader's success does not depend upon his getting more capital, as most small traders think. It depends upon yourself and the shop assistants. The less capital you have, the more you must be popular and friendly.

Success in Retail Business.

2718 H. L. G., Jaipur—Enquires how to be successful in a retail business.

The secret of success in retail trade lies in attracting customers and keeping them by satisfactory service. But among retailers there are many who fail to grasp this very first principle of business and by their acting alienate their supporters, though unknowingly, and this finally brings about their ruin. It is thus evident that the most essential thing which makes up for success in all retail stores is service. Quality of goods, promptness in delivery, courtesy to the customers, reasonableness of prices, etc. are all outcomes of service. These come up by themselves when one keeps the thought of rendering service uppermost in one's mind. You are not entitled to any profit merely because you have opened shops. Your profits are exactly the price what the customers would like to pay for the service rendered to them by the retailers. The amount of profits that accrue is proportionately connected with the value of service maintained at these stores.

A retailer earns his profits because he does something, which the people, we mean the consuming people cannot do for themselves. He makes needed commodities accessible, he raises the standard of his customer's living by searching out and supplying new and better articles. If he succeeds in supplying the real needs, the question of prices he charges for his goods is relatively unimportant. The customer will be the first person to hand over to him a reasonable profit for the care taken in supplying him a needed article.

You should study the habits, manners, customs, etc. of the people with whom you come in contact in the course of your business. Another point of interest in this connection is the acquisition of a working knowledge of the language of the people with whom you deal.

Co-operative Societies.

3548 P. L. S., Coorg—What are the proper functions of Co-operative Socie-

ties and do they really help the Indian poor?

There can be no doubt about it that Co-operative Societies serve a very useful purpose, particularly in the mofussil. Those who are familiar with the ruinous rates of interest charged on the amounts advanced by these village Shylocks, will forthwith admit co-operative societies as real boons to the suffering villagers. The usual rate of interest levied is one anna in the Rupee per month and it is often more than this. It is difficult, if not altogether impossible, for the poor and helpless borrower, once he is entrapped, to extricate himself from the meshes of the creditor. Various other items of payment have to be made, which we know from personal experience having organised many co-operative societies in the province of Bihar and Orissa. As soon as the first transaction is entered into, and the amount borrowed a sum of money, often running up to one rupee, is deducted therefrom by the creditors as *Selami*.

From this appalling state of affairs, co-operative societies rescue the *ryot*. The interest charged by them is reasonable. The money advanced is rarely lost, as every member of a society is jointly and severally liable for the amount borrowed by the individual members. The societies frequently borrow the money they require from a Central Co-operative Bank at a lesser rate of interest. In rural areas, very often paddy is advanced to the individual members on the "deri" system, under which the borrower who generally borrows when he is in need of seed-grains has to repay the same with 50 p.c. added thereon during the harvesting season. Another item is the establishment of Co-operative Stores which can afford to sell many articles of daily use to their constituent members at comparatively reduced rates by purchasing them in mass from places where they can be had of cheap. To be brief, we are of opinion that Co-operative Societies always serve a very useful purpose in Indian villages, and are rarely unsuccessful.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of Industry are invited. Enquiries or replies from our experts will be published free of charge. Questions are replied by post on receipt of As. 4 stamps of small value only for each question. In order to facilitate the work of Editor's Department and to help prompt action the readers are requested to send enquiries in separate letters.]

3 P L K., Ajmer—Wrap the copper wire with brass leaf once or twice and place it in the furnace till the brass fuses and unites with the copper. Thus prepared the wire is further drawn out to fine thread as required.

4 S. A. M., Rangpur—(1) Following is a recipe of Macassar oil: Olive oil 16 oz.; sandal oil $\frac{1}{2}$ oz.; oil bergamot $\frac{1}{2}$ oz.; oil cantharides 2 dr.; butter cocoa 1 oz.; oil rosemary $\frac{1}{2}$ oz. and balsam peru 1 oz. Take 16 oz of finest olive oil and add into this the other ingredients one after another with constant stirring when the oil will be ready for use. Finally strain and pack in phials. (2) Following is a recipe of vinegar of cantharides: Cantharidin 1 gr; glacial acetic acid 200 mills; acetic acid to make 2,000 miles. It is used externally for blistering and may be used in hair lotion. (3) Sandal wood dust is obtained by sawing sandal wood. (4) Yes one of the oils should be coconut oil. (5) Process of manufacturing all kinds of soap will be found in Manufacture of Soap published from this Office. (6) You should not use alum in soap. (7) To make soap hard use washing soda. (8) For flavouring tobacco macerate 2 oz. of cinnamon and 4 oz. of tonka beans, ground fine in a quart of rum. Apply this solution by spraying. (9) For selling paddy you may negotiate with Bama Charan Guha, 82, Chetla Road; Bejoy K. Addy & Amulyadhan Addy, 74, Chetla Road and Haripada Ghose, 8, Chetla Road; all of Calcutta. (10) For selling hides and skins communicate with A. Forbes & Co. Ltd., 12, Dalhousie Square; H. S. Abdul Gunny, 23, Colootola Street and Laljee Mohamed, 11-2, Sukea Lane; all of Calcutta.

7 H. R., Bombay—(1) It is not possible to blacken the grey hair permanently by using hair dyeing pomade. Its action is temporary. Following is a recipe of hair dye pomade: Nitrate of silver 1 part; nitric acid 2 parts; iron filings 2 parts; lard 3 parts; oatmeal 1 part. Mix the nitrate of silver, nitric acid and iron filings and let them stand together for 4 or 5 hours, then pour on them oatmeal. Next add lard and mix well together. (2) Chemicals may be had of Dharamsi Morari Chemical Co. Ltd, Sudama House, Whittell Road, Ballard Estate, Bombay; Karnik Bros., Girgaon, Bombay and H. J. Ratanjee & Co., 69, Cawasji Patel Street, Fort, Bombay. (3) Tooth brushes may be supplied by T. Chatani & Co. Inc., 1-5 Higashi Shimizumachi 1-Chome, Minami-ku, Osaka, Japan.

8 M. B., Navagadh—(1) An article on gas mantle manufacture appeared in June 1933 issue of Industry. If you go through the article you will get all the information required. (2) For mantle knitting machine enquire of Indo-Swiss Trading Co, 2, Church Lane, Calcutta. Chemical required may be had of B. K. Paul & Co. Ltd., 1-3, Bonfields Lane, Calcutta. (3) Paraffin is obtained from two principal sources from petroleum and from bituminous slabs. The crude oil is distilled and its more volatile constituents removed, forming the benzine and burning oil distillates. The residue is subjected to a further distillation in a special vacuum still and paraffin is obtained. (4) You perhaps mean zarda. Following is a recipe of zarda: Hingli tobacco 4 ch; rose water 1 seer. The stalks and ribs of the tobacco leaves are first of all rejected. The leaves are

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W. J. ALCOCK & CO., 7, Hastings Street, Calcutta. Saroup & Bansilal, 57, The Mall, Lahore. Agent for Bareilly District KODESIA ENGINEERING CO., Naini Tal Road, Bareilly.

next boiled in good rose water in an earthenware vessel over a slack fire. Remove when only 4 ch. is left and strain through a clean cloth. Dry the viscous liquid in a procelain dish in the sun to form a cake. Then break the cake into granules and mix with fine particles of silver leaves. (5) You may use metal moulds. (6) Tin cans and collapsible tubes may be had of Shah & Co., 55, Ezra Street, Calcutta. (7) Process of mirror making will be found in December 1933 issue of Industry. (8) It is not possible to manufacture stove pins and Petromax pins at home. (9) You perhaps require white mixture of magnesium sulphate 6 drs, peppermint water 6 oz. (10) For debt collection write to P. K. Ghosh, 12-1A, Nayan Chand Dutt Street, Calcutta.

10 G. M. W., Benares City—Cardboard box making machines may be had of Indo-Swiss Trading Co., 2, Church Lane and John Dickson & Co. Ltd., Grosvenor House, 21, Old Court House Street; both of Calcutta.

11 R. W. C., Bandra—(1) Opium trade is controlled by the Govt. Excise Department so it is not advisable to add a little opium to tea prepared. (2) You must not adulterate tea with any other extract. Take best Assam tea and best Darjeeling tea in equal quantity and blend thoroughly to produce good tea suiting all taste.

13 K. M. H., Kharagpur—(1) For starting a cigarette factory you have to invest at least Rs 1 lakh. Cigarette making machines may be had of T. V. Lynn & Co., 58, Forbes Street, Bombay. (2) An article on cigarette making will be found in October 1934 issue of Industry. (3) You may consult The Home Preservation of Fruit and Vegetables by M. J. M. Watson and Indian Pickles, Chutneys and Morabbas published from this Office. Bengal Canning & Condiments Works Ltd., 3, Gurudas Dutt's Garden Lane, Ultadanga, Calcutta manufacture fruit products.

15 P. T. C., Mandalay—An article on tile manufacture will appear in an early issue of Industry.

16 M. H. P. G., Hyderabad—Refer your query to D. Writer & Co., Bhawanisankar Road, Dadar, Bombay.

18 I. C. S., Lahore—Castor oil may be had of Ashutosh Paul, Nanilal Paul and Jogen-

dra Nath Sen, 242-2, Upper Circular Road, Calcutta.

20. S. K. L., Bombay—(1) You have to invest Rs. 50,000 for starting a factory for manufacturing paints and varnishes (2) For printed tin cans write to Metal Decorating & Shaping Co. Ltd., Narkeldanga Main Road, Calcutta.

26 R. K. C., Pt Pedro—Process of biscuit making will be found in Home Industries published from this Office. For biscuit making machine enquire of W. J. Alcock & Co., 7, Hastings Street, Calcutta and Barliboi & Co., Forbes Street, Fort, Bombay.

27 N. M. C., Madras—You better consult an expert in cinema industry who will help you with all necessary information.

29 R. B., Jaipur—(1) For cut piece cloth write to S. Abdul Latif & Sons, Kashmir Gate, Delhi; G. R. Parker & Co., Connaught Place, Delhi and Kapoor & Kapoor, Connaught Place, Delhi. (2) Oil cloth may be had of Bengal Waterproof Works Ltd., 2, Nazarali Lane, Ballygunge, Calcutta. (3) For velvet write to Haribux Doorga Prasad, 132-1 Harrison Road and Pannalal Sagarmull, 112, Cross Street; both of Calcutta. (4) Wants to buy Japan made crepe ribbon. (5) Butter pressing machines may be had of Barliboi & Co., Forbes Street, Fort, Bombay. (6) For fashion books enquire of W. Newman & Co. Ltd., 3 & 4, Old Court House Street, Calcutta.

30 J. K. K. I., Madura—For chemical analysis you may write to C. S. Marathe, Vile Parle, Bombay and Sudhindra Nath Sen, 6, Kirti Mitter Lane, Calcutta.

34 B. L. M., Galsgala—Both pepper and cinnamon are obtained from plants the first from fruits and the second from bark. For the production of black pepper, the spikes of unripe berries are simply spread out on mats to dry in the sun or they may first be treated with boiling water, which is said to hasten the drying process. Drying by smoking is also adopted, more especially in the Dutch East Indies.

37 V. A. K. C., Madras—A formula of cyclostyle ink will appear in an early issue of Industry.

38 M. K., Bombay—To communicate with any querist write to him with number and initials under care of Industry when your let-

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ter will be duly redirected. A recipe of the oil you require will appear in an early issue of Industry.

41 D. K. D. B., Sirsi—Saries measuring 5 yards in length and 44 inches in breadth are generally used by Bengali ladies.

43 M. S. J. M., Zanzibar—Formulas you require will appear in an early issue of Industry.

47 G. S., Nagpur—(1) Paper is one of the most important commodities manufactured. This industry has ample scope in India for further development. As regards raw materials India possesses some of the biggest bamboo forests and the bamboo is now being utilised successfully for paper making purposes. The cost of machine for a bamboo pulp and paper mill of 5 tons capacity per 24 hours is Rs. 5,50,000. Thus including working capital, a sum of about Rs. 6,50,000 would be required for a properly fitted up mill. For paper making machinery you may write to West End Engine Works Co., Edinburgh 11, and J. & E. Arnfield Ltd., Globe Engineering Works, Near Stockport; both of Great Britain. The above firms will supply you with an estimate for starting a factory. Practical training in some paper mill will facilitate the work. You may however consult The Manufacture of Paper by R. W. Sindall F.C.S. (2) A complete plant capable of producing 300 pins will cost about Rs. 12,000. Trained labourers should be employed to work the plant. It has been calculated that a return of nearly 10 to 15 per cent may be expected in the first year of working. The raw material will at present have to be imported from outside. The industry does not require much technical skill and knowledge and its mechanical side is easily comprehensible. It can be started with advantage. For machine write to Baird Machine Co., Bridgeport, Connecticut, U.S.A. and Morton Brothers, Round Green, Oldburg near Birmingham, England. From one pound of wire you will get 5,000 pins of one inch length. (3) Electroplating can be started with a capital of Rs. 1,000 to Rs. 15,000

according to work intended to be taken, the work is specially suited to youngmen who can secure work or who want to manufacture articles requiring to be electroplated. During 1931-32 India imported electroplated articles worth about 3 lakhs of rupees. Electroplating equipment may be had of S. Mitra & Co., 30, Bentinck Street, Calcutta.

48 T. H. A. S. K., Passara—Fish oil may be had of Baikuntha Nath Sarat Chandra Chakraverty, 5, Nawab Lane, Barrabazar, Calcutta.

49 T. S. H., Jalalpur Jattan—(1) For thermometers write to B. K. Paul & Co., Ltd. 1-3, Bonfields Lane, Calcutta. (2) For cement making machine write to Krupp Indian Trading Co., Ltd., 29, Strand Road, Calcutta. (3) No such dictionary is available.

50 J. S. H., Chhindwara—(1) Hardware may be had of A. N. Hussunally & Co., 20, Strand Road; Kalipada Nandy & Co., 225, Harrison Road and Rajendra Nath Mullick & Co., 20, Darmahatta Street; all of Calcutta. (2) Novelties may be had of S. W. Hari Prasad, B-24, New Market, Calcutta; Herain & Co., 21/1, Creek Row, Calcutta and Hajee Janmahamed Latiff, 299, Abdul Rehman Street, Bombay.

51 K. W. S., Bombay—Cardboard is manufactured by City Paper & Board Mills Ltd., 84, Clive Street, Calcutta.

55 L. F., Nyaungdaun—(1) Instead of bamboo post use small sal post for obstructing falling of sand from all sides. (2) A little crude arsenic finely powdered diluted in water in the proportion of about one teaspoonful in a quart of water for 4 plants and applied to the roots will drive away ants.

56 N. K., Chingleput—You better consult a physician. You may however in the meantime try the following recipe: Take of ipecacuanha powder 12 grains; tincture of assafoetida one drachm; laudanum 10 drops; cinnamon water two ounces, syrup of tolu two drachms; mix. A tea spoonful may be given every three or



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four hours to a child of two years old and to be proportionately increased according to the age.

58 M. V. Allahabad—An article on dry cell making appeared in May, 1934 issue of Industry.

66 B. L. K., Delhi—Following is a formula of tallow substitute: Stearine 8 parts; vaseline 2 parts. Warm and mix together.

67 L. F. M., Quilon—As you have some experience in bakery it is advisable for you to start a bakery in some suitable locality. As regards capital you may induce some capitalist to invest some money in bakery business. As reference you may attach copies of your testimonial of Spencer & Co. when communicating with the capitalists.

68 P. S. G., Amritsar—Process of manufacturing chalk pencils, tin slates, etc., will appear in an early issue of Industry.

69 P. I. W., Jorhat—For the book write to W. Newman & Co., Ltd., 3 & 4, Old Court House Street, Calcutta.

70 G. A. C., Madras—For selling waste paper you may negotiate with Titagarh Paper Mills Ltd., Chartered Bank Buildings, Clive Street, Calcutta. Graphite may be had of Indian Graphite Mining Co., 5, Pollock Street, Calcutta.

72 M. S., Nandarada—You may dry the blood in the sun. It is not possible to preserve blood in liquid condition. Consult a physician.

76 K. P. K., Muttra—(1) For photographic apparatus write to Adair Dutt & Co., 5, Dalhousie Square; Bourne & Shepherd, 141, Corporation Street and Calcutta Camera House, 9, Dharamtala Street; all of Calcutta. (2) Watches may be had of Abrecht & Co., 16, 17, 18, Radha Bazar Street; Anglo-Swiss Watch Co., 6 & 7, Dalhousie Square; and Angora Watch Depot, 131-132, Radha Bazar Street; all of Calcutta. (3) Electrical goods may be had of B. K. Singh & Son, 43, Chattawalla Galli, Calcutta; Associated Electrical Industries (India) Ltd., 8, Clive Street, Calcutta and C. A. Parsons & Co., Ltd., 12 Mission Row, Calcutta.

79 S. N. K., Panitola—(1) You need not register your firm. (2) You need not take any

special license for storing minerals. (3) Groundnut oil as expressed from the seed is liable to contain mucilage and albuminous matters, which produce turbidity in the oil. In order to remove these impurities filter the oil through a filter press; but before doing so you ought to treat the oil with 10 per cent of its weight of fuller's earth which should be dehydrated by roasting prior to use. Mix thoroughly and then heat the mixture to 100°F and maintain the temperature constant for about 15 minutes. Lastly filter the oil through filter press—when a clear oil is obtained but the odour of the oil is somewhat earthy. To remove this bad odour wash the oil with 1 per cent solution of brine containing an equal amount of dry sodium bicarbonate. Recipes of odourless powder and movodor are not known. (4) After preparing the ink strain it through linen add 15 drops of acetic acid per bottle of ink. (5) For dyes write to Fuzle-hussein & Bros., 44, Armenian Street, Calcutta. (6) Stone of myrobalans have no use. (7) Small 'taury' makes the ink deep black. (8) You may use Peru balsam in place of tolu balsam. Cantharidis is a Spanish fly; tinct. cantharidin is alcoholic preparation of cantharidis and oil cantharidin is oily preparation. Menthol has no bad effect on hair. Benzoin is also known as gum benzoin.

80 L. P. G., Matera—You better consult an ayurvedic physician who will give you process of preparing brahmi rasayan.

81 H. S., Chhindwara—(1) Steel trunk may be had of Arya Factory Ltd., 90/2A, Harrison Road; Shankar Factory, 36, Brindaban Bysack Street and Soobal Factory, 9/1, Prosanna Kumar Tagore Street; all of Calcutta. (2) Hardware may be had of Bombay Hardware Mart, 82, Clive Street; Kali Pada Nundy & Co., 225, Harrison Road and T. D. Kumar & Bros., Ltd., 67-4, Strand Road; all of Calcutta.

83 S. R. K., Satara—For books on cigarette-making write to W. Newman & Co., 3 & 4, Old Court House Street, Calcutta and D. B. Taraporevala Sons & Co., Kitab Mahal, Hornby Road, Fort, Bombay.



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6/1. Akrur Dutt Lane, Calcutta.

85 S. K. C., Sivakasi—Following is a list of shellac manufacturers: Deokarandass Prabhudayal Shellac Factory, 50, Bosepara Lane, Calcutta; Government Lac Factory, Fort, Bangalore City, Badlikatra Lac Factory, Badlikatra, Mirzapore; Hajee Shaik Abdul Karim's Lac Factory, Dakkhin Phatak, Mirzapore, and Ram Dass & Behari Lall, Ganeshgunj, Mirzapore.

86 G. L. B., Bagalkot—I think mismanagement is partly responsible for loss in your transport business. Again fare-cutting due to competition is also one of the causes of failure in transport business. Lastly over crowding irregular startings and arrivals, and rudeness of drivers and conductors are also responsible for failure. So in order to make the business profitable you should try to eliminate the above causes.

90 V. S., Meerut City—For lathes enquire of Machine Tools (India) Ltd., Stephen House, Dalhousie Square, Esplanade East, Calcutta. Processes you require will appear in an early issue of Industry.

91 A. D., Karikal—All the ingredients you require may be had of Calcutta Mineral Supplying Co., Ltd., 31, Jackson Lane, Calcutta.

92 D. C. S. C., Ahmedabad—Gramophone records are manufactured by Decca Record Co., 285, Deansgate, Manchester; Globe Gramophone Record Co., Ltd., 56-58, Rochester Pl., London N.W.1; Gramophone Co., Ltd., Hayes, Middlesex; Hindusthan Musical Products & Varieties Syndicate Ltd., 6-1, Akkur Dutt Lane, Calcutta; Indian Gramophone Co., Ltd., 2, Jessore Road, Calcutta and Viel-O-Phone Co., Ltd., Mahim, Bombay.

94 S. S., Landikotal—(1) Process of manufacturing caps will be found in Profitable Industries published from this Office. (2) Machine for manufacturing cork may be had of Taylor & Challen Ltd., Birmingham, England (3) Asphaltum is bituminous product. (4) For machines required for penholder making write to W. J. Alcock & Co., 7, Hastings Street, Calcutta. (5) Process of dyeing leather will appear in an early issue of Industry.

99 W. D. B., Hyderabad—(1) An article on date sugar manufacture will be found in December 1934, issue of Industry. (2) We have no such book. (3) Other formulas you require will appear in an early issue of Industry.

101 M. B., Bangalore City—Typewriters may be had of Remington Rang Inc., 3 Council House Street, Calcutta and G. Rogers & Co., 23, Lal Bazar Street, Calcutta.

102 K. A., Kamrup—(1) Fuller's earth is natural product. (2) Following is the process of making glauber's salt. Take broken up pieces of pure rock salt and put them into an iron pan placed at one extremity of a reverberatory furnace. Next pour upon it the proper amount of sulphuric acid of 50° Be by means of a leaden tube, chemical reaction at once sets in with an evolution of hydrochloric acid gas. When the evolution of the gas is stopped transfer the mass into the bed of the furnace to subject it to a very high temperature. Hydrochloric acid gas is again disengaged and is absorbed by water. When the reaction is complete rake out the fused mass into a vessel and allow to cool. The mass being contained with iron is reduced to powder and then treated with water. Filter and evaporate the solution and lastly set aside to crystallise.

111 P. S. C., Palghat—For white pine oil write to B. K. Paul & Co., Ltd., 1 & 3, Bonfields Lane, Calcutta.

112 N. D., Rohtak—(1) Artificial slate coating on tin consists of a mixture of finely ground slate, lamp black, and sodium silicate solution of equal parts of caustic soda and sodium silicate. (125 sp. gr.). The process is as follows: First prepare the sodium silicate solution by finely washing equal parts of caustic soda and sodium silicate pouring over this 6 to 8 times the quantity of soft river water, which is kept boiling for about 1½ hours whereby the sodium silicate is completely dissolved. Take 8 parts finely crushed slate finely ground with little water into impalpable dust, 1 part lamp black, which is ground with it and grind enough of this mass with the previously prepared sodium silicate solution as is necessary for a thick or thin coating. With this compound the roughened tin plates are painted as uniformly as possible and allowed to dry. (2) To manufacture slate pencils powder finely waste slate and take 60 parts of this and mix with it 30 parts of flour lime stone and 10 parts of silicate of soda. The mixture is kneaded into a plastic mass and forced through a perforated plate and each pencil is deposited on a grooved slate, the overhanging seeds being sawn off, when dry, by passing across a circular saw.

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P. O. Vile Parle, Bombay.

114 S. A. D., Benares City—Process of making ice cream packets will appear in an early issue of Industry.

118 R. N. R., Secunderabad—For learning soap making you may write to Soap Training House, Saidpore, E. B. Ry. Soap making is taught by correspondence by R. Ghose (Soap expert) 8 Kripnanath Lane, Calcutta

119 S. M. R., Pilibhit—(1) Silk may be had of Bengal Co-operative Silk Union Ltd., Maldah and Meenakshi Silk Co., Benares City. (3) Dyeing agents may be had of Fuzlehussein & Bros., 44, Armenian Street, Calcutta (3) Handloom may be had of Handloom Weaving Supplies Co., 94, Baradeo, Benares City. (4) Shuttles may be had of Bros. Partner & Co., 7, Ezra Street, Calcutta.

120 R. M. B., Mailar—Rubber Stamp making materials may be had of B. N. Bysack, 1-1, Ramchand Ghose Lane, Beadon Street, Calcutta and H. C. Biswas & Co., 38, Radhabazar Street, Calcutta.

121 A. T., Delhi—To improve your business by increased selling you should appoint experienced agents who will personally approach the prospects and convince them to buy at least a pair if not more. For finding market overseas you should write to Indian Trade Commissioner, India House, Aldwych, London.

122 H. D. R., Hyderabad—(1) You can manufacture various sorts of articles from sheet metal so it is very difficult in our part to suggest how much capital will be required without knowing exactly the nature of business. You may invest from Rs 5,000 to Rs 80,000. (2) You may take up hurricane lantern making which will require at least Rs. 1 lakh. (3) There is no arrangement for practical training in sheet metal working. (4) It will be advisable for you to consult an expert who will supply you detail information. (5) Machineries may be had of Taylor & Challen Ltd., Birmingham, England. (6) Hurricane lanterns are manufactured by Ogale Glass Works, Ogalevadi, Satara. (7) Formula of

tooth paste will be found in January 1933, issue of Industry. (8) A good recipe of cold cream will be found in July 1934, issue of Industry. (9) December 1934 issue of Industry contains a formula of vaseline pomade (10) A good formula of marking ink will be found in June 1933 issue of Industry. (11) A good formula of fountain pen ink appeared in August 1934 issue of Industry.

125 R. N. S., Alwar—An elastic cement is made by mixing together and allowing to dissolve the following: 4 oz. bisulphide of carbon; 1 oz., fine rubber; 2 dr. isinglass; $\frac{1}{2}$ oz. gutta-percha. This cement is used for cementing leather and rubber and when using the canvas is roughened and a thin coat of the cement is applied. It is allowed to dry completely when the two surfaces to be joined are warmed and then placed together and allowed to dry.

127 M. S. B., Ludhiana—Refer your query to Calcutta Publicity Service, 65/2A, Raja Raj-bully Street and Expert Advertising Agency, 130, Cornwallis Street; both of Calcutta.

128 K. C. S., Khulna—(1) There is no arrangement in India at present for learning manufacture of condensed milk and salted butter. (2) For machinery write to W. J. Alcock & Co., 7, Hastings Street, Calcutta. (3) We only sell our publications. For the book required write to W. Newman & Co., Ltd., 3 & 4, Old Court House Street, Calcutta.

129 K. I. S., Imphal—For agency you may communicate with Calcutta Mineral Co., Ltd., 31, Jackson Lane, Calcutta.

130 M. V. T., Bombay—In cleaning silk it is not advisable to use water more than 110°F. First take the water in a suitable vessel at the required temperature. Add soap flakes or soap solution to make good suds. Cleanse the garment by dipping and pressing but not squeezing. In cleaning cotton goods the cloth should be boiled, for purifying and improving the colour of the clothes. The first thing to be done is to shred enough soap into the boiler

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to form a slight lather on top of the water. Then a quantity of washing soda or crude soda ash is put in. When the water is slightly warmed, the clothes are immersed in the water and as it comes to the boil it will tend to draw any discoloration due to proteins or other colouring matter out of the clothes. When the water boils, let the clothes boil quick for at least one hour. You better consult a lawyer who will advise you.

132 A. R. K., Cocanada—(1) You may try University College of Science, 92, Upper Circular Road, Calcutta. (2) Process of deodorising coconut oil will be found in January 1935 issue of Industry. (3) Gramophones may be supplied by Tonograph-Apparatebau, Hamburg, Koenigstr 79, Germany. (4) Electrical goods may be had of Hanser & Zureich, Triberg, i Schwarzwald, Germany. (5) Second-hand books may be had of Book Exchange, 213, Cornwallis Street, Calcutta.

134 M. H. P. G., Hyderabad—Process of preserving fish will appear in an early issue of Industry.

136 J. R., Bellary—For lapidary wheel write to Hamilton & Co., Ltd, 8, Old Court House Street, Calcutta. For machinery write to W. J. Alcock & Co., 7, Hastings Street, Calcutta.

137 S. B. P. W., Alwaye—(1) You may use metal stamping ink in numbering machine. (2) An article on printing ink manufacture appeared in March 1932 issue of Industry. (3) Block making materials may be had of Houghton Butcher (Eastern) Ltd, 10, Hungerford Street, Calcutta.

139 C. K. J., Gondia—(1) For metal stamps write to Ray's Industries, 33 Kankurgachi 2nd, Lane, Calcutta. (2) For labels write to Cal-

cutta Printing Co., Ltd., 76, Dharamtala Street, Calcutta.

142 R. K. C., Madras—(1) You may advertise in the following newspaper: Rangoon Daily News, 5, Merchant Street; Rangoon Mail, 241-243, 37th. Street and Sun, Fraser Street; all of Rangoon. (2) Instead of giving sole agency for Burma you may appoint one agent for each town of Burma. This will be the wise procedure for you. (3) Then you should take deposit money from the agent. (4) In selecting the agent you should always select the party who is already in the market dealing in similar articles.

143 V. F., Tuticorin—Process of manufacturing cement and sugar candy will appear in an early issue of Industry.

144 D. C. R., Pamidi—Wants to buy secondhand oil expeller.

146 K. D. B., Calcutta—Bristles may be had of Indian Bristles & Lard Supply Co., 31-1, Tangra Road, Calcutta

150 M. H. A. A. C., Santhepet—We have no book dealing with match manufacture. Process of making matches will be found in January and February, 1932 issues of Industry.

153 K. K. C., Jamnagar—Sun's rays are only bleaching agents. To refine castor oil mix 100 parts of the oil at 95°F with a mixture of 1 part of alcohol (95 per cent) and 1 part of sulphuric acid. Allow to settle for 24 hours and then carefully decant from the precipitate. Now wash with warm water, boiling for ½ hour; allow to settle for 24 hours in well closed vessels, after which time the purified oil may be taken off.

154 P. R. R., Madras—Registration of trade mark is a legal procedure so it is advisable for you to consult a lawyer. Your other enquiry appears under Trade Enquiry Columns.

155 B. C., Madras—You perhaps require hair oil. A good recipe of hair oil will be found in October 1933, issue of Industry. You can express oil from the seeds by pressing. The

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sandal wood is first reduced to powder, about 40 to 60 lb. of which are soaked in clean water for 48 hours, then placed in a copper still and distilled. The water carrying the oil evaporates and is condensed in the usual way, when on the cooling the oil floats on the surface and can be collected.

156 P. C., Ajmer—(1) It is not possible to solidify mercury. (2) There is no such arrangement in India for learning dyeing and washing. (3) Mercolised wax is a patent article, formula of which is not known

157 K. C. M., Cochin—(1) Process of manufacturing rubber balls and toys will be found in December 1934, issue under the caption of rubber industry. (2) Following is a recipe of lime juice and glycerine: Almond oil 25 oz.; glycerine $1\frac{1}{2}$ oz.; lemon oil $1\frac{1}{2}$ oz.; lime water to make 80 fl. oz. Mix well by shaking, or else by machine

158 B. S. R., Ghazipur—(1) Mercolised wax is a patent article whose formula is not known (2) A good formula of non-greasy snow will be found in June, 1934, issue of Industry. (3) *Woodfordia floribunda* is known as dhai (4) Hindi equivalent of madder is manit Hindi equivalent of turmeric is haldi (5) For terra rosa, write to Indian Mineral Supply Co., Ltd., 31, Jackson Lane, Calcutta.

159 M. S., Amritsar—Process of manufacturing oxalic acid will appear in an early issue of Industry

160 S. C. C. L., Shahabad—(1) Following is a list of cigarette factories: National Tobacco Co. of India Ltd., 130, Belliaghata Road, Calcutta; Ramswar Tobacco Co., 95, Grand Trunk Road, Salkia, Howrah; Upper India Cigarettes Manufacturing Co., Sukur, Sind; Zenith Tobacco Co., Bombay; Mysore Cigarette Manufacturing Co., Ltd., 29, Malawalli Rama Rao Lane, Bangalore City; and Gold Star Tobacco Co., Borivli, B. B. & C. I. Riv. (2) For preserved fruits write to Bengal Canning & Condiment Works Ltd., 3, Gurudas Dutt Garden Lane, Calcutta and Daw Sen & Co., 29, South Road, Entally, Calcutta. (3) For confectionery write to Dr. D. Writer & Co.

Bhowanishankar Road, Dadar, Bombay; Great Indian Confectionery Manufacturing Co., Mazagaon, Love Lane; Hathu Bag, Bombay; Fine Confectionery Works, 170, Cornwallis Street, Calcutta and Seth Bros., 78-79, Beadon Street, Calcutta Your other query being in the nature of an advertisement can not be published in these columns

163 G. P. A., Jubbulpore—(1) You may consult any book on physics specially the section dealing with light. (2) Lenses may be had of Lawrence & Mayo Ltd., 16, Old Court House Street; London Optical Co., 306, Bowbazar Street; and Stephens & Co., Ltd., 33, Bowbazar Street, all of Calcutta. (2) We are not aware of any such publisher. (3) You may consult Indian Trade Journal issued from 1, Council House Street, Calcutta. (4) Following is a list of homeopathic institutions: The Dunham College of Homeopathy, 135/3, Bowbazar Street; Bengal Allen Homeopathic College, 169A, Bow Bazar Street and R. C. Nag Regular Homeopathic College, 166, Bowbazar Street; all of Calcutta. (5) You better consult Industry Year Book & Directory published from this Office.

164 C. H. R., Tatanagar—For mechanical plough write to Planters Stores & Agency Co., 11, Clive Street, Calcutta.

165 G. V. S., Srinagar—(1) Candle making apparatus may be had of Indo-Swiss Trading Co., 2, Church Lane, Calcutta. (2) For analysis write to Government Test House, Alipore, Calcutta.

166 P. G., Amalner—(1) Sodium silicate is added when saponification has been completed (2) The formula quoted by you should be modified a little to produce good soap Take castor oil 3 srs in place of 12 srs. and rosin 1 sr. in place of 6 seers (3) You may use oil jasmine and oil sandal

168 G. B. M., Srinagar—(1) Tannic acid and gallic acid may be had of B. K. Paul & Co., Ltd., 1 & 3, Bonfields Lane, Calcutta. (2) Ink bottles may be had of Shah & Co., 55, Ezra Street, Calcutta (3) For chalk crayon manufacturing you require only a mould which may be had of Ray's Industries, 33, Kankurgachi 2nd. Lane, Calcutta. (4) Tea is exported by

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170 R. E. W. Ajmer—(1) You may write to Nilmoney Halder & Co, 106, Radhabazar Street, Calcutta for samples of paper. (2) It is not possible to do electroplating work with A. C. Current But you have to instal a special instrument which will make the current pass through the same tract. (3) You may write to Sikri Bottle Store, 14, Ezra Street, Calcutta for glass bottles. (4) Other processes you require will appear in an early issue of Industry.

172 W.M.C., Lahore—It is not possible to remove hair permanently.

173 M. A. Rai, Bareilly—Manure may be had of Agra Manure Works, Agra, and Shahganj Bone Mills, Agra. For sun hemp seeds write to Agricultural Department of your province

174 J. B. P., Patapatnam—We are not aware of any such book.

176 H. P. S. Fatehgarh—You may consult Movie Show, McLeod Road, Lahore; Filmland, 31, Ashutosh Mukherjee Road, Calcutta, and Cine News, Opp. N. J. High School, Bunder Road, Karachi

179 M. Y. S., Jullundur City—Tin printing is done by Metal Stamping & Shaping Co, Ltd., 112, Narkeldanga Main Road, Calcutta, and Indian Colour Printing & Hollow Wares Ltd., 243, Upper Circular Road, Calcutta (2) An article on spirit varnish appeared in Match 1935 issue of Industry. The same issue also contains process of making boiled linseed oil

180 D. P. G., Anja—(1) Alum stone may be had of Dhar Bros., 82, Harrison Road, Calcutta.

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THE HINDUSTHAN SOAP WORKS,
Dept., I, Nawashahr, Doaba, (Punjab).

(2) Thread as required by you may be had of David Mills Co. Ltd. Elphinstone Road, Bombay and Ratilal Bhikhabhai & Co., Girgaon, Bombay.

182 P. S., Yamethin—Small quantities of mercury are found native; but the most common one is the sulphide known also as cinnabar. This is found and worked in Spain, Idria, and California, and also in other localities. Mercury is distinguished from other metals by its property of becoming liquid at ordinary temperatures. Mercury may be had of Banshidhar Dutt & Sons, 126, Khengrapatty, Barrabazar, Calcutta

183 M. C. D. Kawlin—Printed tin cans may be had of Metal Decorating & Shaping Co Ltd., 112, Narkeldanga Main Road, and Indian Colour Printing & Hollow Wares Ltd., 243, Upper Circular Road; both of Calcutta.

185 M. B. Thonze—Dissolve the stareli in water, soak the cloth in the solution, dry then iron

186 V. G. S. Madras—Steel is made from iron by four different methods. You have to use steel casting furnace or you may melt steel in graphite crucibles. It does not require any chemical.

187 B. V. N., Bellary—Embroidery machine may be had of Singer Sewing Machine Co., Clive Bldgs, Clive Street, Calcutta and Indo-Swiss Trading Co., 2, Church Lane, Calcutta

192 M. L. B., Dacca—Following is a formula of rubber stamp ink: Aniline black 1 part; alcohol 30 parts; glycerine 30 parts. Mix and pour upon the pad of the stamp and rub with a brush.

194 M. S., Ellore—You may send your boy to Pannalal Seal Vidyamandir, 5/1, Olai Chandi Road, Belgachia, Calcutta.

195 A. H. I. C., Bhavnagar—For watch making machines you may write to K. Hattori & Co. Ltd., 17, Bakurumachi 4-Chome, Higashiku, Osaka, Japan. As regards estimate you should consult an expert watch maker and repairer. What you have to do is to import the parts from foreign country and adjust them properly. You will not be able to manufacture watch parts here.

196 H. M. A. B., Ilkol—Watchés may be supplied by S. A. Exacta, Wilderswil Switzerland; Swiss Jewel Co. Ltd., Locarno, Switzerland; W. Eppler, Bad Durrheim, Germany and H. Ishihara Shoten, 45, Shinsaibashisuji 1-Chome, Nishiku, Osaka, Japan and Hosoda Trading Co. Ltd., 30, Minami Kyutaromachi 2-Chome, Higashi-ku, Osaka, Japan

199 M. H. P. G., Hyderabad—For sugar coating machine write to W. J. Alcock & Co., 7, Hastings Street, Calcutta. For sugar coating you may negotiate with D. Writer & Co., Bhowani Shankar Road, Dadar, Bombay.

201 B. P. P., Tista Bridge—(1) Cow milking machine may be had of Edward Keventer

Ltd., 11/3, Lindsay Street, Calcutta. (2) You may consult Poona Agricultural College Magazine, Poona. (3) You may consult Poultry Samachar, Sodepur.

202 S. M. P., Kapadwanj—(1) 80 tolas make one seer. (2) Process of making biscuit will be found in July 1933 issue of Industry. (3) No such address is known to us. (4) Dissolve caustic soda in water and test the strength by means of a hydrometer. (5) For rubber stamps in all languages write to B. M. Bysack, 1/1, Ramchand Ghose Lane, Beadon Street, Calcutta. (6) Soda water making machines and bottles may be had of Little & Co., 3, Grants Lane, Bowbazar, Calcutta.

207 M. C., Arni—Process of cement making will appear in an early issue of Industry.

208 K. G. M., Cochín—Following is a good recipe of lime juice cordial: Glucose syrup 8 gals; cane sugar 108 lbs, water 20 gallons; lime juice 18 gals; oil of orange 4 dr; oil of nutmeg 4 dr.; salicylic acid 2 oz; rectified spirit 10 oz. Dissolve the sugar in the water by heat, add the lime juice and glucose syrup. Dissolve the oils and the acid in the spirit, mix with the cordial and filter through a felt bag.

209 A. L. C., Secunderabad—Processes you require will appear in an early issue of Industry.

213 K. J. D., Bombay—Process of manufacturing disinfectant block will appear in an early issue of Industry.

214 I. A., Gujranwala—(1) It is not possible to deodorise barium sulphide. You may use any strong scent to suppress the bad odour. (2) Chemicals may be had of Vandan & Co., Vandan Bldgs, Vandan, Lahore. (3) After preparing the articles appoint agent in important towns of India. If you proceed in this way you have not to spend much for advertisement. (4) You may start cigar making with Rs 100/- on a small scale. (5) Printing on collapsible tube is not done in India. (6) You may try any formula of snow cream.

216 M. R. K., Sind—(1) Saltpetre is itself a manure and does not require any further treatment. (2) It is also used in making fire

works. (3) For selling saltpetre you should advertise in newspapers and periodicals.

217 M. H. P. G., Hyderabad—Platinum is infusible in ordinary furnaces and melts only when exposed to the highest temperature obtained by Deville's Oxyhydrogen Gas furnace viz., above 2000°C.

218 A. M. V., Kottayam—Yes you may try the process and see the result. But you should not insert the tissue paper inside the can. Solder the lid when still hot. But you cannot preserve butter in this way without adding salt. Pickles should be packed in glass pots.

219 T. S. S. A., Badagara—(1) Considered from all respects alcoholic scents are most suitable. (2) For hair oils non-alcoholic scents should be used. For handkerchief scents you should use alcoholic preparations. For permanency use a fixative in alcoholic tincture. (3) White rose is a compound perfume having a characteristic odour of white rose. (4) Heiko scents are manufactured by Heine & Co., Leipzig, Germany. (5) Rose oil is diluted otto which may contain other things too; rose scent may mean either rose otto or rose oil, rose otto a pure extract of rose. It is an essential oil. (6) For paper required by you write to C. M. Sur & Co., 105, Radhabazar Street, Calcutta.

220 N. R. C. L., Muktsar—Hydrogenation plant may be had of Marshall Sons & Co., Ltd., 99, Clive Street, Calcutta and Volkart Bros., 11, Clive Street, Calcutta.

221 R. B., Delhi—For linoleum write to K. C. Marott, 185-187, Hornby Road, Fort, Bombay and Roberts McLean & Co., Mercantile Bldgs, Lall Bazar, Calcutta.

224 N. C. A., Gujranwala—(1) You may purchase draft from Yokohama Specie Bank Ltd., 102/1, Clive Street, Calcutta. (2) Balance should also be paid by draft. (3) You are to pay the Customs duty when clearing the goods from the part. This part of the work may be done by clearing agent whose service is essentially required for doing any import business. (4) The clearing agent will also forward the goods to the destination. (5) Following is a list of clearing and forwarding agents: Bhawanidas & Sons, 328-330, Samuel Street, Vadgadi, Mandvi, Bombay; Padamshi Kanji, Gaumukh Bhuvan,

G. Dey & Co.,

Suppliers of Stationery to the Government of India & Corporation of Calcutta, etc. Rubber Stamp Makers, Die-Sinkers, etc., etc. General Order Suppliers. Quote for your esteemed enquiries & hope we shall be able to please you.

13, SATRUGHNA GHOSE Le, CALCUTT.

Telephone—B. B. 1735.

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Use Dr. DeGo's Kanak hair oil and Kanak hair lotion. Unique medicines for baldness, hair falling, grey hair. Patients of hair diseases are cured by marvellous treatment by

Dr. DEGO, Hair Disease Specialist (Lond),
49/B, Harrison Road, Calcutta.

Phone B. B. 4386

10, Musjid Bundar Road, Bombay; Bysack Landing & Shipping Agency, 26A Chive Street, Calcutta; Cox & Kings (Agent) Ltd., 5, Bankshall Street, Calcutta, Burpori Cawasji & Co., Bunder Road, Karachi and Karachi Landing & Shipping Office, Nave Jetty, Karachi. (6) You have to arrange yourself for clearing and forwarding the goods through agents.

229 O. B. F., Lahore—(1) Cardboard boxes are manufactured by Gogate Paper Box Works, Princess Street, Bombay. National Paper Box Mfg Co., Bhuleshwar, Bombay; Cardboard Box Manufacturing Co., 38, Colootola Street, Calcutta; L. B. Verma & Co., Juhli, Cawnpore. (2) Cardboard box making machinery may be had of John Dickinson & Co., Grosvenor House, 21, Old Court House Street, Calcutta. (3) We are not aware of any such book.

230 Y. D., Surat—(1) The difference between acetic anhydride, glacial acetic acid and acetic acid is that the former is the concentrated pure acetic acid free from water while the latter is dilute acetic acid (1526 of gms of glacial acetic acid in 100 mls. of water). (2) Silicate used in soap manufacture is water soluble, so that it may be determined from the solution obtained after the separation of fatty acid. (3) Rosin is the residue obtained after the distillation of turpentine oil from oleo-resin. Resin is the amorphous substance that exudes from the plant. Rosin is used in soap manufacture and in varnish manufacture. (4) Animal charcoal once used cannot be used again. (5) Cocoa and coconut are two different fruits. (6 & 7) You should use machine for making soap powder. The machine may be had of Director of Industries, 40/1A, Free School Street, Calcutta. (8) Yellow prussiate of potash is known as potassium ferrocyanide. You can prepare it in laboratory. (9) Paraphenylenediamine is a chemical compound. Its manufacture is very complicated. You better buy it from a chemist shop. (10) A good recipe of depilatory cream will be found in April 1933 issue of In-

dustry. (11) No, you should not use phee in place of butter. (12) You may manufacture printing ink on a small scale.

231 B. K. R. C., Gouripur—Process of wig-making will appear in an early issue of Industry.

232 P. W., Agra—Process of making gilding solution will appear in an early issue of Industry.

233 D. K. R., Benares—It is not possible to make tea tablets without tea, sugar and milk.

235 D. P. C., Alipath—Industry is the only journal of its kind in India.

239 M. B., Raipur—(1) You may refer your query to the Secretary, The Association for the Advancement of Scientific Studies of Indian Students in Foreign Countries, 10, Old Court House Street, Calcutta. (2) Yarn may be had of Laxmidas Purohottamdas, 73, Cross Street, Calcutta.

240 P. B. K. C., Polur—For shuttle part write to Greaves Cotton & Co., Ltd., Forbes Street, Fort, Bombay.

242 D. C. D., Fatehabad—You better consult How to do Business by N. Banerjee published from this Office.

243 A. C. S., Jammu—(1) For knitting wool write to Cawnpore Woollen Mills Ltd., Civil Lines, Cawnpore. (2) For piecegoods write to Bansidhar Jallan & Co., Chandni Chowk, Delhi and Padam Chand & Co., Delhi Cloth Market, Delhi.

246 B. S., Dalhousie—(1) Waterproof coats may be had of Bengal Waterproof Works Ltd., 2, Nazarali Lane, Ballygunge, Calcutta and B. C. Nawn & Co., 7, Bowbazar Street, Calcutta. (2) Boots may be had of Young & Co., 69, Bentinck Street, Calcutta; American Boot House, Chandni Chowk, Delhi and Modern Boot House, Cannaught Place, Delhi. (3) Umbrella may be had of Mohendra Lal Dutt & Sons, 49, Harrison Road and Nandalal Dutt, 131, Old China Bazar Street; both of Calcutta. (4) Torches may be had of K. G. Maniar, 55, Canning Street, Calcutta. (5) Hosiery goods may be had of Sashee Bhushan Kar & Co., 46, Radha Bazar Street, Calcutta and Mohammad Ismail & Sons, Chandni Chowk, Delhi.

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know its excellence." Mr. Justice A. S. R. Chari, Bangalore, 13th December, 1933

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Post Box 2092, Bombay.

OUR FACTORY VISITS

CALCUTTA CELLULOID WORKS, LTD.

It is a matter of joy to note that the manufacture of celluloid articles in India is now engaging the attention of our industrialists. A number of firms have already been started to take up the manufacture of celluloid goods. We had recently the pleasure to pay a visit to the factory of the Calcutta Celluloid Works Ltd. The factory is located at 62, Monoharpur Road, Ballygunge, on the outskirts of Calcutta. The authorities showed us round the factory and explained the process of manufacture for which they deserve our best thanks.

The factory is equipped with varied up-to-date machines for punching, cutting, trimming and polishing, toothing, stamping, etc. etc. It is a sight to see how celluloid sheets of various thicknesses and colours are being cut out into suitable sizes, shaped and then pressed in dies and given shapes which at once inspire admiration.

All these operations require extreme caution in execution. The sheets are to be heated to get them softened for moulding, and the regulation of the temperature takes the best skill of the Company. The teeth of the combs must be cut at equal distances apart and exactly to the same depth. The combs are examined, each and every one of them, before being passed on into the finishing department and the defective ones are rejected.

In a celluloid factory, the skill of the experts are tested by the quality of the combs produced in the factory. We have the highest pleasure to endorse that the quality of the combs that the Company manufactures is highly satisfactory and is even superior in durability to the foreign makes in some points. These are of various colours—mottled, shell, red shell, turbid and transparent, etc. These are also of various sizes and specifications which will meet the fastidious taste of all classes of people—gents, ladies and girls. These include tooth combs, two and three sided combs, pocket combs, side combs, etc.

Besides combs, the Company manufactures assorted varieties of soap cases of oblong, oval and round shapes of light deep, marble and shell colours. Their other manufactures include spectacle frames, a speciality of their own, powder boxes, hair pins, knitting rods, tongue cleaners, pant clips for cyclists, shoe horns, paper cutters, wrist watch bands, ludo balls, etc. etc.

We understand that arrangements are now almost complete for manufacturing tooth brushes. We wish the Company success in their enterprise.

G. PAUL & SONS.

None can admire too much the extraordinary talent of Mr. Gopewar Paul, the renowned sculptor of Krishnanagar in Bengal. The remarkable skill he has displayed in making statues and busts of eminent men has already marked him out as one of the greatest sculptors of India. We have seen him working in the cremation ground of Deshbandhu C. R. Das; we have seen his work, the bust of Deshapriya at the Northern Park. His powers as a sculptor and modeller are now more developed than ever. Recently we paid a visit to his studio at 6, Kasi Mitter Ghat Street, Calcutta a solitary nook in Baghbar. It is a world all his own, the world of his imagination to which he has given shape. Mr. Paul is a cosmopolitan in the choice of his models. His studio is decorated with countless things of art and beauty. We have all admiration for the bronze and plaster of paris statues which adorn the studio and which, we have the highest pleasure to testify, are fine execution of art and are most life-like. The models of animals are pictures of perfection.

We had a long talk with Mr. Paul in course of which he stated that he hailed from Krishnanagar in Bengal, a town famous for clay modelling. In 1915 when Mr. Paul was only 14 years of



Mr. G. Paul in his Studio working on the bust of Late Sir Ashutosh Mukherjee.

age Lord Carmichael, the then Governor of Bengal, paid a visit to the studio of his grand father. Mr Paul was then learning the art from his grand father. Taking hold of this opportunity he sprang a surprise upon Lord Carmichael by preparing his likeness in clay in a few minutes' time only. Lord Carmichael who knew how to appreciate merit could not forget this remarkable talent of Bengal on returning home, and in 1924 through his intervention S. Paul was invited by the Govt. to participate in the British Empire Exhibition at Wembley, London. S. Paul too justified Lord Carmichael's choice and won certificates of honour and medals besides numerous appreciations from the press and the public including H. R. H. The Duke of Connaught. The Daily Telegraph of London at the time announced him as the "Lightning Sculptor" for his rapid skill in modelling.

And the designation 'lightning sculptor' does not even a bit smack of exaggeration. During the last Congress Exhibition in Calcutta in 1928 Dr. Ansari, the great national leader, sat before Mr. Paul for ten minutes and he got his bust ready. Pandit Motilal Nehru gave two sittings of fifteen minutes in all and his bust was there, in appreciation of which the Pandit said that it was an exact likeness of himself and was a real work of art.

Mr. Paul here recounted an interesting story to justify the remark of Panditji. The clay model of Sri Srimat Bishudhananda Paramahansa Dev of Bandul (Burdwan) from start to finish was prepared at 20 Rup Narayan Nandan Lane, Bhowanipur. The model was seated on a stool and S. Paul was sitting beside and scraping clay and mud from the body of the model. The room was packed with disciples and Paramahansa Dev was in another room. Now a disciple who had long been absent and did not know anything about the clay model, on entering the room slowly advanced towards the model, made his obeisance and put some coin as the mark of respect near the feet of the model. Every body was spell bound and after a couple of minutes or so one of the disciples who were present there requested him to take the money and offer it to Gurudev when he would be there. At this the new comer realised the situation and said that he could not understand that it was a clay model and so long only he had been thinking why father was sitting with mud all over his body. The marble statue that was made by Mr. Paul was exact replica of the approved clay model.

Among the chief works of Mr. Paul may be mentioned the marble busts of Sir Romesh

Chandra Mitter, Sir Ashutosh Mukherjee, late Sir Kinnar Ghosh, founder of Amrita Bazar Patrika, Justice Dwarka Nath Chakraverty, late Mr. B. E. J. Burge I.C.S., District Magistrate of Midnapur, Swami Keshabananda, Sir P. C. Ray, late Kaviraj Shamadas Bachaspati, Birla, and many others.

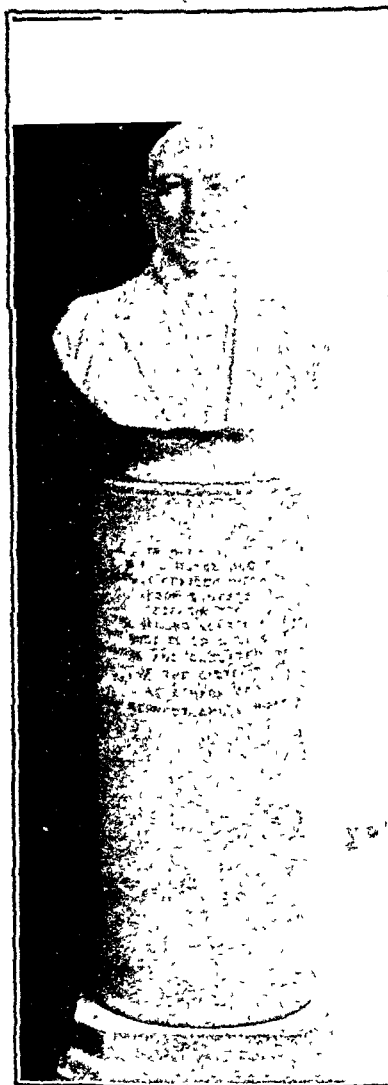


Photo from the Marble Bust of Late Mr. B.E.J. Burge, I.C.S., District Officer, Midnapur placed in the Midnapur Court.

REVIEW OF BOOKS

BANKING IN INDIA by S. G. Panandikar, M.A., D.Sc. Econ (London), Professor of Economics, Elphinstone College, Bombay. Published by Longmans Green & Co., Ltd., 39, Paternoster Row, London, E.C.4 Pages 344.

While in the advanced countries in the West the students of economics and practical bankers have written series of books on the sound organisation of the banking of the country to meet the growing requirements of trade and industries, in India the literature on the banking practice and organisation has been rather scanty. The number of books on this vast and interesting subject could be counted on the finger. It is as late as in 1929 that the Banking Enquiry Committee was appointed to make a thorough investigation of the past and existing banking conditions in India and to consider steps, for its development and regulation. The momentous Report of the Committee which in addition to the Reports of Provincial Committee covers about 20,000 pages makes too bulky a volume for the ordinary readers. Mr Panandikar, the author of the present volume, has done a great service by bringing together the essential features of the Report within a reasonable compass and by presenting a clear and detailed account of indigenous and modern banking. He has taken considerable pains in describing the operations of money-lenders and indigenous bankers; co-operative and land-mortgage banks and loan offices; joint stock, exchange, and the Imperial Bank of India. The chapters on Industrial Finance, Regulation of Banking, Banking Education, etc., will also be found interesting. There is also a chapter on the Reserve Bank of India which deals with its constitution and functions.

Though not an original work, the book will be very useful as a compilation of all available information bearing on the development of Indian banking.

WHERE LABOUR RULES by H. R. S. Phillpott. Published by Mathuen & Co., Ltd., 36, Essex Street, London, W.C.2, Pages 114, price 2s. 6d.

Mr. Phillpott undertook an extensive tour in England, Scotland and Wales at the request of the Daily Herald to investigate and report on the municipal administration of counties where the Labour Party was in a definite majority. The achievements of the Labour Party in the Parliament have met due recognition from all sections of the people and the manner how the

Labour majority in control of local government delivered themselves remained to be seen. The present book brings to light that the Labour policy of serving humanity above all things and the courage displayed in handling local affairs have been rewarded amply by the improvement of the municipal conditions. In many cases when the Labour party took up the reins of the local administration, it was much in a neglected and financially embarrassed condition and in most cases by careful administration Labour did bring financial muddle to an end and had wrenched municipal Government back on to a sound basis. The author after examining the municipal administration of Sheffield, Leeds, Glasgow, Norwich, Lincoln, etc., comes to the conclusion that one beneficial effect of the Labour control has been that there is now a new outlook which relieves the hopes of distressed areas and reawakens the civil conscience of communities and restores a faith in the future.

THE BREAKDOWN OF MONEY BY CHRISTOPHER HOLLIS. Published by Sheed & Ward, 31, Paternoster Row, London E.C.4 Pages 232, price 4 sh. 6d.

The monetary system of the world has collapsed completely. The entire machinery of international finance is out of gear and has brought about fundamental changes in the national and economic life of man. In the present volume Mr. Hollis presents an historical explanation of the breakdown of money. The unique part that money plays in the shaping of the history of individuals and nations often escapes the notice of the historians but nevertheless this is a most important factor to be reckoned with in writing history which is too often dominated over by the political considerations as setting orientation to a nation's internal and foreign policy. The present volume describes the financial systems obtaining in various countries and explains the causes which are directly responsible for the sudden collapse of the entire financial structure. He ascribes the failure not to a little extent to an unwise banking practice that whenever money is invented, a percentage must be paid for ever afterwards as a propitiation to a banker. Mr. Hollis is a constructive thinker. He cannot conceive that the world will be content for long like a blind horse to starve knee deep in corn, to tolerate want with abundance all around, the destruction of food while men and women and children are perishing for

lack of it. He strongly condemns the present policy of the Bank of England of restricting the money supply in the name of sound finance and of leaving the problem of equating purchasing power with goods to look after itself and has considerable misgiving about the current British international finance policy in the present age of contracting markets. Mr. Hollis is of the opinion that it is possible to devise a sensible method of issuing new money which will not be accompanied by an increase in prices but by an increase in goods.

THE SECRET OF JAPAN'S TRADE EXPANSION by Isoshi Asahi. Published by the International Association of Japan, Tokyo. Pages 64, price Yen 1.

It is a paradox to many, not excluding the well-informed ones, how a small country like Japan could prove to be a "standing menace" to the world's industrial organisation. The ascendancy of Japan in the industrial firmament is so sudden that there is now much talk about dumping of Japanese goods and sweated labour in Japan. Mr. Asahi has not been a day too soon to publish the present book to remove the misunderstanding about Japan and to repudiate the serious charges laid against Japan that she was instrumental in bringing down the standard of living of the world. The author brings together an array of facts and figures to show the hollowness of the accusations. Mr. Asahi fully shows how groundless these charges are. He quotes figures to show that the per capita exports and imports of Japan are far less than those of United Kingdom, Holland and Belgium and that Japan's share in World's trade is far lower than that of any of these countries or U.S.A., France, Italy or Germany. He makes an interesting analysis of the labour conditions in Japan and the general standard of living and shows that these are not incomparable with those in the leading industrial countries. The most important chapter of the book is that devoted to the unravelling of the secret of Japan's trade expansion in recent years. The secret lies in Rationalization of Industries on a large scale. While the manufacturer in other countries did nothing but grumble about the hard times, the Japanese manufacturers boldly attempted to improve organisation and technique, to economise labour and to reduce costs. Increased efficiency of Japanese labour in recent years is also an important factor in Japan's industrial progress. To consider only the cotton spinning and weav-

ing industries. In June 1929, it required 61.2 male and 218.9 female operatives to work ten thousand spindles for one day in Japanese cotton spinning establishments. The wages amounted to yen 362.93. As the rationalization progressed, the number of operatives was reduced in December 1932 to 31.9 male and 164.1 female workers. The wages paid decreased to 48% or yen 174.29. And the same story holds good in the case of other industries. The dexterity and diligence of the workers also contribute largely to the reduction of cost. We request all Indian industrialists to read and re-read this chapter which will obviously supply them with much food for reflection.

THE INTERNATIONAL MERCANTILE DIARY AND YEAR BOOK, 1935. Published by The Syren & Shipping Ltd., 44 & 46, Leadenhall Street, London, E.C.3. Price 10s. 6d.

The nineteenth annual edition of the International Mercantile Diary & Year Book has just been received. This new edition as usual is an improvement over its predecessors, and differs in many respects from the usual export publications in being much more than a list of importers and exporters. It combines the useful offices of a guide to the exporter in his overseas shipping arrangements, a desk diary and a compendium of valuable commercial information.

The International section of the book deals with every country in the world in turn, giving in the simplest possible language everything the exporter wishes to know about sending goods or postal matter all over the world. Among the many features of the book are Consular, Customs and Imperial Preference Regulations, particulars of Consular Documents required, with Facsimiles; Legalisation Fees; Packing and Marking of Goods; Regulations for Commercial Travellers and Samples; Patent and Trade Mark Laws. This section also contains comprehensive lists of the populations and industries of towns in Great Britain, forwarding agents, shipping lines serving British and overseas ports; the principal British, Colonial and foreign banks and the United Kingdom import regulations.

On the whole the publication is unique, not only for containing information which is not elsewhere collected in one volume, but in being kept up-to-date throughout the year by a quarterly supplement. The Year Book is thus an authoritative reference right up to the time of its supersession by the next edition.

NOTICES & REVIEWS.

[Manufacturers sending specimens and samples of their products for notice and review may please note that no notice is published of medicinal preparations and allied substances in this section.]

Cold Cream.

We are glad to receive a bottle of Himvati Cold Cream from Messrs H. K. Dyer & Co., Kameshwar's Pole, Raipur, Ahmedabad. The preparation has been found to be eminently suitable for the purpose for which it is meant

Tooth Powder.

We have received from Dr. K. B. Sarma, Polamur, West Godavari District a sample packet of medicated tooth powder. It not only cleanses the teeth satisfactorily but also strengthens the gums and prevents pyorrhoea.

Manure.

We have received from Mineral Products Mfg. Works, Aderbhuwan, Jumatalal, Nagpur City a sample packet of mineral manure claimed to contain a phosphate, sulphate, chlorate and nitrate, which are indispensable for the rapid growth of plants, etc. The mixture appears to be good

Cigars.

We have the pleasure to acknowledge receipt of the assorted variety of cigars from D. Z. Dhabuwala, 27th, Marwari Road, Mandalay, Burma. These cigars are excellent, and unlike other brands, are mild and delicately perfumed to musk the strong odour of tobacco. We wish them a wide market.

A S Moitra, 71/1, Patuatola Lane, Room No. 14, Calcutta has also sent us sample packets of cigars manufactured by him. The cigars are found to be satisfactory.

Bombay Congress Guide 1934. Published by The Reception Committee, 48th. Session of the Indian National Congress, Bombay. Price Rupee one only.

This Congress Guide is planned more as a memento of the session than as a tourist guide. It begins with the history of development of the Bombay City together with description of places of importance worth seeing by visitors. It next deals with the evolution of the Congress and the progress it has made year after year. At the end of the book there are some important appendices such as, a list of congress organisations in India, a list of congress Presidents, Constitution and Rules of business of the Congress Parliamentary Board and All-India Congress Socialist Party.

Distemperers.

We have the pleasure to receive from B. H. Yelburgi, M. Sc, Agrahar Street, Gadag, 2 packets of distempers, which are found to be good and serviceable.

Fountain Pen Ink.

We are glad to receive a sample phial of fountain pen ink from Sharma Mechanical & Electrical Works, Nai Sarak, Delhi. The Preparation is found to be of superior quality.

Medicated Hair Oil.

We have received from Sudarshan Aushadhalaya, Bikaner, Rajputana a sample phial of hair oil prepared with indigenous herbs. It claims to possess the properties of keeping the brain cool and stimulating the growth of hair.

Black Hair Oil.

We have received a phial of Black hair oil from its manufacturer A. R. Shaikh, Mandvi, Dt. Surat. It is claimed that its constant application changes the grey hair into black, stops their growth and assists the scalp to produce black hair permanently.

Ink Powders

We have received from Kohinur Industrials, (India), Kallianpur P. O., South Kanara several sample packets of "Bharathi" ink powders such as blue-black, black & violet. The inks produced by these powders are of excellent quality.

We have also received from Mail Order Company, Jalalpur, Fyzabad two sample packets of blue and red ink powder. The preparations are satisfactory producing good inks when dissolved in water.

Acknowledgment.

Muslim Review edited by S. Abid Husain Naqvi, B.A., B.L., Published from 16, Canning Street, Lucknow. Annual subscription Rs. 5/- only. This monthly is a bold advocate of Muslim cause in propagating the ideas of tolerance, on the light of Islam and its teachings.

Indian Printer and Stationer. Published by The East and West Trade Developer, Rajkot, Kathiawar. It is a monthly paper dealing with printing stationery. This special number contains many useful articles concerning the development of printing business, diary, calendar, etc. It is nicely printed and is excellently bound.

Trade Enquiries.

(To communicate with any party write to him direct with name and address given below mentioning Industry).

31 Bijon Behari Bhattacharjee, Bamunaria, Durgapur, F. 1 Ry.—Wants to be put in touch with a capitalist who can finance a pottery work.

57 Noor Mohamed Osman, 316 Church Street, Pretoria, Transvaal, S. Africa.—Can supply seed-jacket and stone sweat.

65 B. K. Mukherjee & Co., 94, Bardeo, Benares City.—Want a capitalist to finance gut making and tanning business.

83 S. R. Kulkarni, Kirloskarwadi, Satara.—Wants to be put in touch with an expert who can blend and flavour tobacco for cigarette manufacture.

105 P. N. Ammiah Pillai & Co., 63-64, Ebrahim Sahib Street, Bangalore.—Want to be put in touch with suppliers of cork tips.

113 Dominic Marattukalam & Sons, Changanacherry, Travancore.—Can supply rubber, pepper, ginger, cardamom, nutmeg, soapnut, cashewnut, turmeric, coffee, croton seed, tapioca, coconut oil, arecanut, arrowroot, etc.

126 M. Lingaiah Pantulu, Chirala, M. S. M., Rly.—Wants to be put in touch with importers of Kaily and Sarsan in Rangoon and Singapore.

146 Krishna Das Balial, 30, Armenian Street, Calcutta.—Wants to be put in touch with suppliers of bristles.

154 P. Rama Rau, Late Revenue Officer, Sitaraman, Adyar, Madras.—Wants to be put in touch with the manufacturer of vegetable tallow or margarine.

197 V. G. Date, Laxmi Bhawan, Near Veterinary Hospital, Katni.—Wants to be put in touch with the purchasers of khus, lime, mohua and oil seeds.

200 T. Abdurrahim, 1, Neelkollai, Mosque Street, Ambur.—Can supply mango fruits, tamarind, jaggery and betel leaves.

205 Qudsia Rice Mills, Chakrata Road, Saharanpur.—Want to be put in touch with exporters of cellery seeds from India and importer of the same in foreign countries.

225 General Import & Export Agency, Tel-Aviv, 26A, Rothschild Bd, Palestine.—Want agency from respectable Indian firms.

241 S. M. Purohit, Kapadwanj, Kaira.—Wants to be put in touch with Bombay firms dealing in secondhand soda-water bottles.

263 Ganga Saran Rajpat Rai Guptas, Subaki Gate, Lashkar, Gwalior.—Want to be put in touch with dealers in fresh and dry fruits in Calcutta and other places.

276 B. H. Pundalik, 160, Imli Bazar, Indore City.—Wants to be put in touch with dealers in waste silk.

MAY ISSUE OF INDUSTRY.

(In the Press).

May issue of Industry which will be published in the first week of the month will contain articles on Canning and Preserving Fruits and Stove Enamelling, in addition to the usual features such as Small Trades and Recipes; Formulas, Processes and Answers; Reader's Business Problems and Brief Queries and Replies. Any friend of our subscribers will get a copy free as sample on applying to the Manager, Industry Office, Shambazar, Calcutta.

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Industry

THE MAGAZINE FOR MANUFACTURERS & BUSINESSMEN.

VOL. XXVI.

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NO. 303.

Build A New Village Life.

“**B**ACK to the land” was the cry raised with enthusiasm since Mr. C. R. Das laid out his scheme of village reorganisation. His scheme practically died with his untimely death.

Mahatmajī's organisation of Village Industries Association has drawn attention of all prominent people to the village—even the Government has taken a big step with one crore of rupees to begin with.

Nearly ninety in every hundred people in India reside in villages. Yet they attract no attention not only from the authorities but also from the leaders of the people in any welfare work. Villager's need of clean roads and homestead, healthy life, useful education, better farming methods—these are nobody's concern.

On the other hand the villages are losing their best boys; the village schools and village education are out of touch with village life and do not inspire people for any village improvement. Rather these open the eyes to the dullness and squalor of village life and those who receive a little learning in villages leave them for ever to illiteracy and poverty and seek to town to swell eventually the rank of the unemployed.

The cry now should be not back to the village but “stay in the village” and all our endeavour should be to make the village suitable for a better class of people—more educated, more cleanly, more healthy, more ambitious—to stay there.

All village industries should be grown and all villages persistently taught to be self-sufficient first. Village traders should form into co-operative bodies to teach village industrialists the needs of modern customers and to organise sale of village produces first. Improvements must come from inside the villages themselves and cannot be thrust upon them from outside.

Education of the villagers should direct to better life in villages, better farming, better seed production, better marketing, and less thirst for city life. Will Government devote its grant to the creation of a newer and better village life?

Manufacture of Enamelled Wares.

THE manufacture of enamelled ware is one of the growing manufacturing industries of India. There is already a number of factories producing enamelled wares for household use, sanitary fittings, hospital requisites, etc. Still there is room for many more to meet the growing demands in the country which is amply shown by the heavy annual imports of these commodities from abroad, especially from Japan.

Enamelling is really an application of glaze to surfaces of metals just as the application of other glazes is performed to porcelain, glass or earthenware, so that these articles take a brilliant polish and are not acted upon by acids or alkalis, and are not subject to oxidation. The chief object of all enamellers should be to produce that kind of enamel which will not split off or crack from the effects of heat.

Enamelling requires two different compositions the first is known as the ground enamel while the second the cover enamel.

GROUND ENAMELS.

The ground enamels are those intended for direct application to metallic surfaces and, when applied and heated, must assume a state of semi-fusion (frit), so as to form a backing or foundation for the cover enamel. There are various recipes and methods for preparing them. The following recipe may be advantageously followed in making such ground enamel. It consists of 30 parts of ground flint and 20 parts of borax, calcined and finely ground. The mixture

is first melted to a fluid mass in a kiln and then to the fused mass is added about 25 to 40 per cent. of flint meal and an equal quantity of white clay. Ground felspar may be employed to replace the added flint meal. The mixture is then allowed to remain there for several hours until it is thoroughly melted together. To ascertain whether both of the ingredients are completely melted, a hot iron rod coated with very refractory enamel is inserted into the melting pot; when it is found that the rod can be moved about freely without meeting with any appreciable resistance, it may be considered that the mass is properly melted. With little experience the manufacturer will, however, be able to ascertain by time alone the termination of this process; but it is always advisable to use the rod before letting the charge run out, as it may happen, despite the care taken to ensure proper admixture of the materials, that some parts of the mass are more refractory than the rest, in which case the rod is the only reliable test. When the whole mass is fused, it is at once dropped into cold water, whereby a rapid quenching of the material is effected. This makes the mass brittle and easily reducible to fine powder. The quenched material on being carefully dried is ground in a pug mill.

Another very refractory ground enamel mass consists of the following:—

Flint meal	30 parts.
Borax.	16.5 "
White lead	3.5 "
Fused and ground along with Flint meal	25 to 40 parts.

Potter's clay	20 to 25 parts.
Magnesia	5 to 6 "

A few typical recipes are appended below:—

Owing to the presence of magnesia this mass is more refractory than the other, but is superior to the latter in many ways, being much easier to apply, and adhering strongly to the superior-imposed cover enamel.

A third but very satisfactory ground mass especially suitable for iron utensils is as follows.—

Flint meal	30	parts
Borax	10	"
Magnesia	4	"
Magnesium sulphate	225	"
Soda	175	"

fused together and ground with

Flint meal 18 per cent of weight of mass taken.

The above recipes are suitable for all purposes in the enamelling of cooking utensils, boiler tubes, etc.

COVER ENAMEL.

The cover enamel is really a glass made translucent or even quite opaque by the addition of tin oxide or other white opaque bodies. This acts as a glaze over the ground layer and is invariably compounded in such a manner as to be more readily fusible than the latter. Since the enamel required for this purpose must be fused readily and distributed uniformly over the ground enamel when melted, its composition must be regulated so as to enable these conditions to be fulfilled.

The recipes for cover enamels are far more numerous than those of ground masses. The manner in which the formulas may be modified depends on the purpose for which the product is intended.

I.	
Flint meal	37.5 parts.
Borax	27.5 "
Tin oxide	30 "
Soda	15 "
Saltpetre	10 "
Ammonium carbonate	7.5 "
Magnesia	7 "

Fuse together in a similar manner as indicated in the preparation of ground enamel and then ground with:—

Flint meal	6.12 parts.
Tin oxide	3.66 "
Soda	0.70 Part
Magnesia	0.70 "

II.

Flint meal	25	parts
Porcelain	25	"
Borax	25	"
Tin oxide	20	"
White lead	20	"
Soda	15	"
Saltpetre	11	"
Ammonium carbonate	7.5	"
Magnesia	6	"
Ground with		
Flint meal	6	"
Tin oxide	3.75	"
Soda	0.75	"
Magnesia	0.80	"

PREPARATION OF THE CRUDE WARE.

Enamelled articles are generally made of iron ware (cast or wrought iron) and in order to enable the ground enamel to adhere to the metal and prevent it chipping off the latter has to be prepared beforehand by a special treatment.

This is a very important factor, since if the operation is not carefully performed, even the best-made enamel may chip off in a very short time. The preliminary treatment of the vessels consists in thoroughly cleaning them from all traces of adhering dirt, grease or soapy material from the surfaces. This is usually done either by a sand blast or by annealing the metal in a muffle kiln. By this means the elasticity of the sheet metal, which has been lost during the forging drawing, planning, or pressing processes, is restored by heating. After being cleansed, the articles are dipped in a pickling liquid capable of dissolving away any superficial layer of oxide and rendering the metal perfectly bright.

The usual strength of acid pickle is 1 part of commercial sulphuric acid to 20 to 22 parts of water, time of immersion varying from 10 to 12 hours. But if the exposure for certain reason or otherwise cannot be continued for the above specified time, a stronger acid must be used, but for slower working a weaker pickle is employed. As a rule the ware should not remain longer than 24 hours in pickle. After pickling the articles are taken out of the bath, rinsed in cold water and scrubbed over with fine sand (preferably quartz sand) until the surface to be enamelled is perfectly bright. The next step is to rinse the goods, in order to remove every particle of adherent sand, after which they are dipped in hot water for a few seconds and then exposing them to the air, whereupon the thin stratum of water is immediately evaporated by the heat of the metal. The dried articles are then ready for receiving ground coating.

APPLYING THE GROUND ENAMEL.

The work of enamelling is always divided into four operations, namely, applying the two coatings of (ground and cover) enamel, and firing the same. In themselves these tasks are all very single and apparently easy to carry out. In reality, however, their performance requires great skill and experience. A slight error in the manipulation would lead to the production of defective wares. An immediate covering or enamelling of the cleaned crude ware with white enamel is impossible by virtue of its composition processing an expansion coefficient essentially different from that of iron. Moreover, the tin oxide content of the white enamel brings about a blister development, since this oxide is reduced by the carbon present in the iron at the heat of the muffle. Before the white coating the crude ware must therefore be provided with an enamel cover possessing very definite chemical and physical properties. The enamel to be used is called ground enamel, a good number of recipes of which has already been given above.

To impart the necessary fluidity to the ground enamel a portion is taken up in a ladle of enamelled iron and poured into a pan where it is reduced, by the addition of water, to a thick cream, which must be stirred until perfectly homogenous and free from lumps or excessive thinness in places. The best way to obtain this end is by adding the water in small quantities and stirring it continuously.

The ware to be coated is heated in a drying oven to about 40°C which is necessary to facilitate the adhesion of

the enamel mass and then the enamel is uniformly applied over the surface of the body with a stiff brush.

But the usual method is that a sufficient amount of creamy enamel is poured into the utensil, which is then uniformly distributed over the inner surface of the article, this being facilitated by tapping the piece with a wooden mallet. Finally the piece is laid mouth downwards, in a couple of horizontal supports, placed over the enamel pan or over another vessel to catch the dripping or excess of enamel. When drained, the piece is set on a table and enamel is carefully wiped away from all parts that are not intended to be coated, after which it is immediately put over stove fire to dry.

The success of the entire operation depends on this process, since if the ware is put in a hot place before being perfectly dry, the enamel easily separates from the metal, and the ware will need re-touching to produce a proper coating.

FIRING THE GROUND ENAMEL.

Firing consists in heating the coated ware sufficiently to produce incipient fusion of the granules of the enamel mass, without causing them to run together into a perfectly uniform mass; so that the process is really more one of sintering than true fusion.

The ground mass may be fired on to the ware by suspending the latter over a bright fire of wood, charcoal, or coke, until the necessary degree of heat is attained. These fuels are, however, attended with the disadvantage of giving off particles of flying ash, which are carried along by the gases, the reducing action of the gas also corroding the enamel mass. Consequently, to obviate these

inconveniences, the firing of the ware is always performed in muffle furnaces.

Before commencing to charge the muffle it must be raised to cherry-red heat inside, the rear being then almost pale red. The objects are inserted first in the cooler part of the muffle, and afterwards pushed gradually onward to the hotter parts. Flat pieces, such as basins, stewpans, etc., may be set upright on the bottom of the muffle, whereas latter articles, after the enamel on the bottom is fused, must be laid down sideways, and turned round so as to bring the enamel on the sides into a state of fusion.

The operation of firing ground enamels should not take longer than 20 to 25 minutes at most, in a well-heated muffle. If not properly fired in this time, the enamel mass is evidently too refractory, to remedy which defect a certain quantity of calcined borax or boric acid can be mixed in with the diluted enamel by prolonged stirring. If this does not produce the desired result nothing else can be done but to add borax to the mass and fuse it over again.

As a practical sign that the ground mass has been properly fired, the best indication is that it cannot be rubbed off by the figures. If, on the other hand, the mass assumes the appearance of a smooth lustrous covering on the surface of the ware, this is indication of excessive fusibility. In this case the ground mass forms, in itself, an enamel, and the firing of the cover enamel is then attended with difficulties. This defect may be corrected by an addition of some refractory substance, such as flint meal,

porcelain shards or clay, all of which are very serviceable.

APPLYING AND FIRING THE COVER ENAMEL.

When the utensils are taken out of the muffle in which the ground enamel has been fired on, the uncovered parts of the metal will be found covered with black coating resulting from the action of oxygen on the glowing metal. As this layer of oxide easily falls off and will colour any cover enamel, it must be carefully removed by scrubbing with sandpaper before the covering mass is applied.

The cover enamel in the meantime is diluted with water, the extent of dilution having been determined by a preliminary experiment as the thinner the layer the handsomer and more durable the enamel. The covering layer must, however, be thick enough to cover properly; and therefore, when the mass is rich in tin oxide, it can be diluted to a greater extent than otherwise feasible.

After applying the enamel, the articles are dried in the same manner as before and fired in a muffle furnace. The firing temperature in this case is much lower than that required for ground enamel and frequently turned and laid on their sides in order to facilitate uniformity of fusion. As soon as the mass appears to have fused completely, the ware is taken out of the furnace, but is prevented from cooling down too quickly or the enamel will craze through lack of time for uniform contraction. To prevent this, the finished ware is transferred to a muffle furnace, kept at a gentle red heat, where the pieces are piled up, and

the muffle is then closed and left to cool down gradually. It is advisable to employ for this purpose a large muffle so that as many pieces as possible can be treated at a time. Under the circumstances the muffle need not be more than moderately hot, the radiant heat from the large charge of ware sufficing to raise it to the right temperature.

When cooled the ware is enamelled on the outside. This operation is performed in the same manner as before, except that commoner ground and cover masses, requiring less heat in firing, are employed. As coloured enamels (dark blue, coloured by cobalt, or red brown, by ferric oxide) are mostly used for this work, the ground mass is generally of low quality, made from impure materials and showing a yellowish or reddish tinge of colour.

REPAIRING DEFECTS IN ENAMELLED WARE.

In producing enamelled ware on a large scale it must happen, despite every precaution, that a certain percentage of the goods are defective and unfit for sale. Most of the defects are due to overheating the ware. To rectify this it is a best plan to chip off all the defective enamel with a sharp-edged hammer, and then to coat fire the exposed surface anew with ground and cover enamel. By this means major portion of defective ware are made saleable. It cannot add to the credit of any maker to be continually offering large quantities of this second rate goods. This should be reduced to a minimum by employing properly taught workmen.

MANUFACTURE OF STARCH.

STARCH is a white glistening, tasteless carbohydrate widely and abundantly distributed in the vegetable kingdom, occurring in nearly all plants in a greater or less quantity. It forms rounded grains of characteristic appearance in the several varieties, and is most abundant in the fruit, tubers, seeds, and stems of the plants from which it is industrially obtained. It plays a very important part in several industrial processes. It is generally manufactured from rice, wheat, potato, maize, corn flour, etc. All these are available in huge quantities in India but the starch derived from any of these sources exhibits some special characteristics. The manufacturing processes are also different with different ingredients. As rice is extensively cultivated in India and contains a higher percentage of starch than any other starchy materials, we shall begin with the extraction of starch from rice.

RICE STARCH.

The demand for this kind of starch has grown chiefly because of its suitability for laundry purposes due to smaller granules than any other starch. When made with boiling water, the resulting mucilage is better adapted for starching than any other.

The rice used in this industry is the broken grains separated with the husks in the cleansing mills.

Since the cells of the grain are composed of dense glutinous material and the starch granules are cemented together so firmly by albuminous and gummy water that the separation of starch particles from granules is very difficult and

requires several stages in order to obtain a finished product. The process as dealt with in MARTIN'S INDUSTRIAL CHEMISTRY is as follows:—

The rice is soaked with a very dilute solution of caustic soda (0.3-0.6 per cent. solution, a stronger solution gelatinises the starch) in large cemented tanks. This dissolves the gums and nitrogenous matter cementing the starch cells together. The wet rice is then finely ground between millstones, keeping it moist during the process with caustic soda solution. The grinding finally disintegrates the agglomerate of starch cells into the individual cells. The mass is next transferred to vats provided with stirring apparatus, and a milky suspension of the fine starch particles is obtained, the cellulose, fibres, and heavier constituents sinking to the bottom. The starch milk will not easily and quickly deposit the starch by sedimentation (as is the case with potato starch), on account of the extreme smallness of the rice-starch granules. Consequently to extract the starch, the milky liquid is transferred to rapidly rotating centrifugals, the drums of which are not perforated to allow the water to escape. As the result of the centrifugal force, the starch granules settle out as a compact ring on the interior circumference of the rotating drum, the outermost layers being practically pure starch, while the internal part of the ring is composed of impure starch, mixed with cell fragments of mixed starches. In the middle of the drum the water settles out as a clear liquid; this is run off, and the compact

ring of starch is taken out, and the interior impure layer scraped off and made to undergo the same process again. It is usually necessary to add a trace of ultramarine to the starch in order to obtain a pure white. The starch is then cut into 7-in. cubes, pressed in iron forms until the water content is diminished to 45 per cent., and then slowly dried in drying chambers. When the amount of water reaches 29 per cent., the surface layer of starch is scraped off. This layer is of a yellowish colour and contains a considerable quantity of impurities which have diffused out with the water from the interior of the cake to the exterior, and been left behind by the evaporating water. The residual cake of starch is now packed in cardboard or paper boxes, and dried until peculiar longitudinal fissures or cracks appear. It has then 12 per cent. of water.

During the process of drying great care must be taken to guard against the development of moulds on the surface of the starch—a result of the incomplete separation of the nitrogenous matter—such moulds often completely spoiling the goods.

The alkaline liquid or “lye” separated from the starch during the grinding and soaking process contains a considerable amount of nitrogenous matter in solution. The dissolved matter is precipitated by sulphuric acid as a glutinous mass, which, when dried, forms a valuable cattle food. The other waste liquids from the manufacture are valuable manuring waters for meadow lands, and are used as such. Their escape into small streams is dangerous.

WHEAT STARCH.

Next to rice, wheat also contains a large percentage of starchy matters. A gram of wheat consists of (1) the germ, (2) the endosperm or kernel, (3) the outer envelope or husk, which constitutes the bran. The husk has an outer cuticle from which delicate hair spring. Under this there are three other layers the two outer of which consist of flattened cells.

The process now adopted for making wheat starch is the Martin's Process. In this process the wheat flour is mixed with 40 per cent of water to form a stiff dough, placed in special kneading machine and the excess of water kneaded out. Most of the starch goes into suspension in the water, forming a milk, while the sticky gluten and cellulose fibres remain behind as a thick soft mass. The open kneading machine most used for the process consists of a trough in which two kneading arms are worked in opposite directions one directly by means of a pulley and the other indirectly by means of toothed wheels. The wings revolve at different rates, so that no clogging can occur. The starch milk is emptied out of the trough from time to time, the last traces being removed from the remaining gluten by passing the mass through rollers.

The starch milk is separated into pure “prima” starch and glutinous “secondary starch” by centrifuging in special drums, which are non-perforated, the process being exactly the same as described in the manufacture of rice starch. The drying is also carried out as with rice starch, similar fissures making their appearance in the dried mass as in the case with rice starch, the fissured

appearance differentiating the valuable wheaten and rice starch from the cheaper potato starch. Even on adding glutinous material to potato starch it is impossible to obtain this fissured appearance

The gluten-rich secondary starch is either directly used as food (also as cattle food) or is allowed to spontaneously ferment at 50°C., when a further yield of starch is obtainable

With proper care 100 parts of flour yield 60 parts pure "prima starch," 10 parts "secondary starch," and 10 parts of the sticky gluten. The gluten is difficult to completely dry, and being a proteid, in a wet condition rapidly undergoes putrefaction.

POTATO STARCH.

Potato starch is most important in Europe. The tubers contain an average of about 20 per cent. of starch and 75 per cent. water. The skin contains some fats and colouring matter, but no starch. The adhering dirt and sand are carefully removed by washing in a revolving drum made of wood or iron slats with narrow openings between them for the escape of the dirt, etc. Inside the drum are revolving arms which rub the potatoes together, or revolving wire or bristle brushes which scrub them as the drum turns. The washing must be thorough or the quality of the starch suffers. The tubers are next rasped or ground in a machine consisting of a revolving cylinder or roll, around whose outer surface are set a large number of narrow knife-edges or saw-blades, which project about one-fifth of an inch. These knife-edges rotate very close to fixed wooden bars which catch and hold the potato while it is scraped into soft pulp.

VOL XXVI No 303.

The starch in the potato is enclosed in little cells or bags of cellulose, a number of granules being in each cell. Since the starch can only be washed away from the ruptured cells, the finer the pulp the larger the yield of starch. But even with the best rasps many cells escape unbroken, and usually about 15 per cent of the starch is lost. Sometimes the pulp is reground after it has been washed, which increases the yield of starch slightly.

The pulp, consisting of starch and cellulose fibre and tissue, passes into a series of shaking sieves, where the starch is washed away with a limited amount of water. A better apparatus consists of a series of revolving wire gauze cylinders (30 to 35 meshes to the inch), containing brushes which revolve in a direction opposite to the motion of the cylinder. Fine jets of water play upon the pulp and wash out the starch. The milky liquor passes to a revolving sieve with 50 meshes per inch, which retains any fibre that passes through the coarser screens. Long semicylindrical sieves containing brushes set in the form of an Archimedian screw around a revolving shaft are sometimes used. The brushes push the pulp along from one end to the other, at the same time thoroughly working it over, while the starch is washed out by jets of water. The waste pulp passing over the sieves is treated by Buttner and Meyer's process; it is pressed and dried rapidly until the moisture is about 12 per cent. It is sold as a low-grade cattle food.

The starch suspended in the wash water is run over inclined tables. The crude product is stirred up with water

in a tank, and after the sand and heavy dirt have settled, the starch in suspension is rapidly "syphoned" off through holes in the side of the tank. By levigation, the starch is obtained in several grades of purity. Centrifugal machines are also employed to separate the starch and wash water, but with less success than in the case of corn, wheat, or rice starch.

The crude starch obtained by any of these methods is purified by repeated washings and levigation, with a occasional passing through sieves or bolting cloth to remove fibre. The purified starch is dried in much the same way as is corn starch.

Potato starch is also made by the "rotting" process, in which the moist, sliced material is heaped in a warm room. Fermentation and ultimate decomposition of the cell walls take place, so that the starch can be washed out of the pulp. Much care is necessary that the fermentation does not attack the starch itself. The mass must be turned over frequently during decomposition.

The wash waters from potato starch contain much potash, phosphoric acid, albumin, and nitrogenous matter, which soon ferment and become very offensive. If possible they should be used at once to irrigate land. Much ingenuity has been expended to devise means of making them less offensive but without much success.

The yield from 10 pounds of potatoes is about 15 or 16 pounds of dry starch. The product is chiefly used in the textile industries for laundry purposes, and in glucose and dextrine making; for the two last mentioned it is customary

to use the "green starch," containing from 30 to 40 per cent. water.

MAIZE STARCH.

Maize starch, now an enormous industry in the United States, is carried on by the alkaline or sweet process. The grain is run through a fanning mill to blow away dust and husks or any other substances which might afterwards injure the machinery parts. Then it is steeped in water at from 74° to 140° F, for from three to ten days so as to render its constituents more easily separated. The well-steeped grain is then ground in buhr-stone and roller mills through which water is flowing; the starchy magma goes to revolving sieves of brass wire for the coarser straining, and then to cylindrical reels covered with bolting cloth. The mass which passes over the sieves is reground and again sifted. The waste glutinous matter is pressed and dried for cattle feeding.

The milky liquor from the sieves is settled and drawn off from the crude starch, which is washed twice with fresh water and then pumped into vats having good stirring apparatus, and provided with holes in the sides, closed by plugs and used for decanting the liquor. A dilute caustic soda solution of 7° or 8° Be. is stirred into the starch until the liquid becomes greenish yellow; then the whole is stirred for several hours. When a test shows that the suspended matter settles in two layers, the starch on top, sedimentation is allowed to take place and the supernatant liquor, containing much oil and nitrogenous matter in solution, is drawn off. The sediment is stirred up with water, allowed to stand until the

gluten has deposited, and then, by pulling the plugs in succession, the starch in suspension is "syphoned off" into tanks. By several repetitions of this process the starch is nearly all removed from the gluten and at the same time is separated into several grades. The residue then flows on to a long, slightly inclined table, or "run," from 60 to 120 feet long and having a fall of 3 or 4 inches. A stream of water flows slowly over it and washes away the gluten and fibrous matter, while the starch deposits on the table.

The starch collected in the several tanks is washed with water and sometimes again syphoned, and is then run through bolting cloth to the settling tanks, where it deposits in a dense compact layer from which the water can be drawn off. The wet starch is then shovelled into frames lined with cloth and having perforated bottoms, through which the water drains. The cake of damp starch is cut into smaller blocks and placed on porous floors of plaster of Paris or brick, which absorb the adhering water. The starch is removed to the dry room and kept at a temperature of 125° F. for several days. While it is drying, the impurities still remaining in it find their way to the surface, where they form a yellowish deposit which is cut away when the starch is nearly dry. The block is then wrapped in paper and further dried at 150° to 170° F. for several days. During this time the mass contracts and cracks into a number of irregularly shaped prismatic rods, called "crystals," though they are not true crystals. The entire drying process requires several weeks, and the product as sent to market contains about 10 to 12 per cent. of water,

PROGRESS OF COTTAGE INDUSTRIES IN BIHAR & ORISSA.

COTTAGE industries in Bihar, and Orissa as in other parts of India form an integral and vital part of the agricultural life and play an important part in the economic welfare of people in rural areas, for, agriculture which forms the mainstay of the people cannot by itself support them even in normal years. The census returns of 1931 show that nearly a million and a half of the people are having these industries as their principal or subsidiary occupation. Besides these, there are many times more people who are returned as agriculturists and who carry on some handicraft or other for additional income. The numbers of persons employed in various cottage industries, grouped under the following main heads, are reproduced from the census report of 1931.

PERSONS EMPLOYED IN INDUSTRIES.

	As principal and subsidiary occupation.
1. Textile industries (cotton, wool, silk and jute spinning and weaving) ...	2,74,000
2. Agricultural and food industries — ...	2,39,232
3. Workers in wood (including basket makers)	1,87,327
4. Exploitation of minerals	1,56,881
5. Potters, brick and tile makers — ...	1,56,552
6. Workers in metal (including brass and bell metal) — ...	1,18,628
7. Chemical industries (including oil crushing) — ...	1,14,015
8. Gold and silver smiths ...	87,840
9. Boot and shoe makers — ...	46,661

10. Tailors	36,919
11. Toy making, taxidermy, etc.	9,264
12. Workers in leather, horn, bone, etc.	6,224
13. Makers of scientific and musical instruments, printers, engravers, etc.	2,156
	<hr/> 13,35,699

These cottage industries at present carried on with antiquated and wasteful methods have yet to be modernised and the efficiency of the workers improved by the introduction of labour saving appliances. They should also be provided with efficient commercial organisations which would bring their products into markets where they are in greatest demand. These were the considerations which prompted the local Department of Industries to frame a comprehensive programme for the development of a few important cottage industries as can be seen from the following short account of its activities for the last 14 years of its existence.

HANDLOOM INDUSTRY.

Hand-weaving being the most important cottage industry of the province with 163,000 handlooms and an annual output of nearly 4 crores of rupees, it was recognised that the most obvious step to cheapen the cost of production and to increase the income of hand-weavers was the introduction of improved appliances and processes.

With the establishment of a separate department of Industries in 1920, with a Textile Expert and an increased itinerant demonstration staff and an efficient organisation for field work, these demon-

stration parties, which were gradually increased to 10 in number and posted in all the districts of the province (excepting Angul and Champaran where possibilities were less), yield phenomenal results; for in the following 13 years ending March 1934, they introduced as many as 33,350 flyshuttle looms, 1,086 dobbies, 155 warping mills and other appliances and encouraged the weavers to weave finer counts of yarn and better designs in the place of traditional coarse "Motia" cloth.

One-sixth of the cloth consumed in Bihar, one-half of that consumed in Chota Nagpur and three-fourths of that consumed in Orissa are woven on local handlooms. Up to 1920-21, the hand-weavers in this province consumed per annum (average for five years) 22 million lbs. of mill-spun cotton yarn both Indian and foreign—the imports of machine-made goods being nearly 30 million lbs. of foreign and 20 million lbs. of Indian cloth. Similar figures for the subsequent 12 years are not available as the compilation of rail-borne trade statistics had been suspended as a result of the economy campaign by the various provincial Governments. The recent publication of these statistics by the Director-General of Commercial Intelligence and Statistics for the year 1933-34 shows that the net imports into Bihar and Orissa of Indian and foreign yarn had been 30.7 million lbs. The imports of mill cloth for this year were also high and amounted to 86.5 million lbs.—the share of Indian mills being as much as 76.7 million lbs. It will be seen from these figures that the handweavers of this province were not able to take

advantage of the increasing local demand for country made cloth to the same extent as the cotton mills of the other parts of India. It is, however, noteworthy that in spite of severe economic depression the consumption of yarn by handweavers during the last year had been the highest on record. Without taking into consideration increased yardage due to the recent use of finer counts of yarn, it is estimated that the weavers of this province now produce 40 per cent. more cloth than they used to do prior to 1921. In money value this additional output is estimated to be about a crore of rupees at the present low market rates for cloth,—nearly half of which representing the wages and profits of weavers and others employed in this industry.

These figures are imposing enough but it is difficult to estimate the extent to which the introduction of improvements referred to above has contributed to the development of this ancient but important cottage industry of this province. Thus apart from the direct economic gain to the weavers and their dependants whose total number is estimated to be about 4,00,000, the demonstrations have an educative value which cannot accurately be assessed in terms of £. s. d. The hapless weaver is no longer left alone with his technical troubles and difficulties; for, he can now place these before the staff of the Department of Industries who can and do help him to overcome them.

DYEING AND CALICO-PRINTING INDUSTRIES.

Dyeing and weaving are twin crafts. The traditional art of vegetable dyeing

is dead for all practical purposes. On the other hand, we have now an immense range of chemical dyes which is truly puzzling even to an educated person not to speak of a village dyer. More through ignorance of the true properties of this bewildering and formidable list of dyes, inability to distinguish the good from the bad and lack of experience in the art of chemical dyeing, the ancient and beautiful art of dyeing has suffered considerable degradation in India now. It will, therefore, be admitted that the situation called for some action from the Department of Industries. Government were, therefore, pleased to sanction in 1925-26 the starting of a dyeing demonstration party consisting of a dyeing demonstrator and four dyeing maistries and to increase the number of the latter later on to 10 (now reduced to 7). It is the duty of these demonstration parties to instruct the professional dyers and printers whose number is reported to be 909 and a very much larger number of weavers, in the selection of proper dyes and to ensure that the best results ensue from their use. During each year, the dyeing demonstration parties visit about 200 villages throughout the province where dyeing demonstrations are carried out in naphthol, indanthren, sulphur and rapid fast colours and a fair amount of dyes is sold.

In addition the modern method of calico-printing by "discharge" process has been demonstrated and introduced in place of the antiquated "tie and dip" method which is clumsy and wholly unsatisfactory. Another important achievement has also been the successful introduction of printing industry at

Bhagalpur, where about 35 new factories have recently been started for the production of printed silk sarees.

TOY-MAKING AND LACQUER WORK.

Every one is familiar with the crude and primitive wooden toys of hackneyed designs and of poor, lustreless finish which are to be found everywhere not only in this province but throughout India. And yet the importation of foreign toys in the country to the value of over 40 lakhs of rupees a year is a clear indication that there is a wide scope for the profitable manufacture on an extensive scale as a cottage industry in this province. With this end in view a modest beginning has been made in the toy-making section of the Cottage Industries Institute. The problem, however, is a very complex one involving the use and application of improved appliances, process, infinite varieties of designs, newer raw materials, better finishing and painting and so on. With the help of information gathered from such foreign literature as has been published on the subject of toy-making and as a result of constant attempt at experimentation and application of greater innovation and ingenuity, much improvement has been effected in the character and quality of toys which are being produced by the students of the Cottage Industries Institute out of wood, cardboard, lead and imitation marble.

CARPET MANUFACTURE.

The statistics of sea-borne trade show that the export of Indian carpets to European countries is fairly large and amounts in these days of low prices to 73 lakhs of rupees in value on an average per annum. There is, therefore, suffi-

cient justification for assisting this ancient cottage industry. In Bihar and Orissa this industry is carried on by about 200 weavers concentrated in a few important centres of Obra, Sasaram, Daudnagar and Bhabhua in the districts of Gaya and Shahabad and cheap "ansis" and rugs of inferior quality are being produced for local markets. This trade is gradually declining as the weavers find it difficult to earn a living wage. Investigations carried on show that a demand for carpets can be created (as in U.P., Punjab and Madras), provided an efficient manufacturing and marketing organisation is set up. It should be recognised that in a scheme for the development of carpet weaving, the designing of suitable colour schemes and patterns and the dyeing of fast colours should receive adequate attention. Efforts are now being made to assist the local carpet industry by training at the Cottage Industries Institute, Patna, every year a dozen boys in the weaving of carpets of better workmanship and more artistic designs.

WEAVING OF DURRIES.

Weaving of cheap durries with coarse yarn (2 counts, spun out of waste cotton) forms an important industry of Patna city and supports nearly 800 weavers and their families. The bulk of these goods produced here are exported to Bengal where they find a ready sale among the poorer classes of people. Durries are also woven in Sasaram, Daudnagar, Hajipur and a few other places in Bihar but those of superior quality and workmanship are being imported from Agra and Cawnpore. The existence of a large colony of durrie weavers at

Gulzarbagh prompted those who drew up the scheme for the starting of the Cottage Industries Institute to include durrie weaving as one of the subjects to be taught in the institute. Although the Department of Industries has not so far been able to induce the local weavers to weave the new design for the reason that they are having adequate demand for their own patterns of cheap durries, it succeeded in introducing the use of cotton durries in European homes and establishing a small export trade in these.

SILK INDUSTRY.

About 15 years ago, the Bhagalpur silk industry was mainly confined to weaving of tasar either alone or in combination with cotton. As trade increased in volume and tasar became scarce, imported spun waste silk which is both cheap in cost and easy to weave began to find increased consumption. No attempt, however, was made by the trade to weave finer goods with reeled mulberry silk which is the finest silk of all. A profitable trade was built up in Burma for fancy shirtings, coatings, etc., but cut-throat competition soon debased the trade resulting in the use of poor materials and fugitive dyes to such an extent that this trade soon began to decline seriously.

The Silk Institute as soon as it was established in 1922, undertook the task of training the artisans in the art of weaving handspun "eri" and reeled mulberry silk and the use of high quality fast dyes in addition to that of the introduction of better designs and textures. The art of silk printing was introduced for the first time about six years ago. The cumula-

tive effect of all these improved innovations soon led to a marked decline in the use of fugitive dyes and to an increase in the production of a new class of silk fabrics of chaste designs mainly for export to other parts of India. The application of power looms has also come into existence—an innovation which bids fair to bring about a revolution in the organisation of the Bhagalpur silk industry. The effect of all this is that whereas 12 years ago the annual gross value of the output of trade was worth only Rs. 8 lakhs, it rose to nearly Rs. 25 lakhs up to the time when the present economic depression set in.

WOOL WEAVING.

Wool weaving is an indigenous industry of the province and is carried on extensively in the districts of Gaya, Sahabad, and Palamau. About 2,400 handlooms are engaged in this industry. The province produce about 20,000 maunds of wool a year, but on account of the poor quality of the outturn of the handlooms an increasing portion of this wool was gradually going out of the province. It may be mentioned here that the weaving of blankets in vogue in this province is a curiously crude craft; narrow strips measuring about one foot in width and woven on extremely crude appliances are stitched together to make a blanket which gives a number of hard joints lengthwise, thus rendering it fit for use only by the poorest classes of the population. Under such conditions the production of a very unsatisfactory and unattractive article is inevitable and is calculated to result in gradual, but nevertheless certain extinction of the industry. No attempt is made to dye wool

and the application of any kind of design is conspicuous by its entire absence.

With a view to rectifying this state of affairs the Wool Weaving Institute, the only one of its kind in India, was first established by the District Board of Gaya in 1932 on the advice of the Department of Industries and later on in 1925 it was taken over by the Department itself. The first task tackled was the designing and construction of a satisfactory loom which would weave blankets in one operation. This has been attended to with success. Wherever this loom has been demonstrated its introduction has followed as a matter of course. About 100 looms have so far been introduced; but the work of introduction has been much hampered for want of a satisfactory demonstration party trained in wool weaving. In addition to the foregoing, a few boys belonging to the "Ganderi" class or hereditary wool-weavers are being annually admitted into this institute and given thorough training in the use of all the improved appliances with which the institute is equipped as well as in scientific dyeing, designing and diversification of products. About 60 boys have been trained and turned out by the institute so far and it is expected that as these find their way back into the industry the cumulative effect of their absorption in this manner will not only certainly stem the tide of disintegration with which the industry was faced but will lead ultimately to its revival and resuscitation.

—K. S. RAO, L.T.M., A.T.I.

BUTTER FAT OR GHEE INDUSTRY.

BUTTER fat or ghee is natural butter freed from water, curd (casein) salts and extraneous matters. It occupies a very important position in the daily diet of the Indians especially the vegetarians who do not take any animal food. But it is strange that though there is undoubtedly a demand for this article, pure ghee is almost entirely absent from the markets of all the large towns of India. Our purpose here is not to discuss with the quantity of the adulterated products available in our markets but to give a fair idea of the process usually followed by the indigenous ghee manufacturers with some suggestions of its improvements in making pure ghee.

Though pure ghee is practically unobtainable, there is no adulterated ghee sold at a price within the reach of the majority of the population, and even were the amount of adulterants doubled, there would then not be sufficient adulterated ghee to permit each member of the population to obtain an adequate supply.

The raw material for this important article is milk from cows and buffaloes. The milk of goats produces ghee with an objectionable odour, and for this reason is seldom used. In order to understand, therefore, fully the nature of milk fat, it is necessary to devote some attention to the study of the nature and composition of milk itself. Milk is defined as the product of secretion obtained from the glands of female mammals from the time of the birth of the baby for its nourishment and growth. Its main con-

stituents are water, fat, casein, milk sugar and salts.

AVERAGE OF COW AND BUFFALO MILK.

	Minimum.	Maximum.	Average.
Specific gravity	1.0264	1.0370	1.316
Fat	1.67%	6.47%	3.59%
Casein	1.79%	6.29%	3.02%
Milk-sugar	2.11%	6.11%	4.78%
Salts	0.35%	1.21%	0.71%
Water	80.32%	90.69%	84.4 %

In the above table, the average composition of the milk of the cow and buffalo is given. The amount of ghee, which can be obtained from a gallon of milk depends largely on the quality and quantity of the food which is fed to the animal. Taking an average, one gallon of buffalo milk will yield 12 ounces of ghee, a similar quantity of cow's milk will produce about 6 ounces of ghee.

The milk is taken and placed in a clay or metal pot and heated for 1 to 3 hours, depending on the quantity, until it thickens through loss of moisture. When the desired thickness is obtained, it is cooled. At this stage it is soured by the addition of curdled boiled milk (dahi) and allowed to stand for 12 hours. In place of curd, a vegetable or animal rennet is sometimes used for souring purposes. The souring of the milk precipitates the casein and sugar of milk, in the watery layer below the soured curd. The curd is separated and placed in a churn, which is revolved until the butter has formed, or is churned in a vessel by means of a split bamboo, jirked upwards and downwards, or alternatively revolved in the soured milk. After about half an hour, a little warm water is added, and the churning continued for another half an hour, when the butter forms. The

butter is then roughly collected, and is heated in warm water to separate out the remaining curd, which is entangled in it.

DEFECTS OF THE PROCESS.

It is quite a common thing in this country, to allow the butter and remaining curd to be collected from day to day in an earthenware pot, until there is sufficient quantity, say 10 to 15 seers to make a saleable quantity of ghee. During this period of "collecting" the product is not properly covered but exposed to all kinds of dust and germs, and the acid value of the resulting ghee rises abnormally, owing to the presence of the acid curd. In general, the acid value of ghee as sold in this country may range between 5 and 15, whereas, ghee prepared under proper conditions would have an acid value under 1. The methods of preparation are extremely crude, and the conditions are such that there is but little doubt that much disease prevalent, in India, could be traced to the processes and conditions under which the various milk products are manufactured. It is not improbable, owing to the various heat treatments in the process of manufacture, that the majority of the valuable vitamins contained in milk, and milk products, are entirely destroyed. On the other hand, it is possible that many disease germs are also destroyed. There is no doubt that ghee could be prepared, under the same hygienic conditions that butter, and milk products, are prepared in Europe. Ghee is nothing more than butter which has been carefully melted and freed from curd.

According to Mr. J. A. HARE DUKE of H. B. Technological Institute, Cawnpore the existing wasteful and harmful

bed parallel to each other and 2 to 2½ feet apart. The excavated soil is put on the spaces between the channels. Thus flat ridges and narrow channels are alternately formed. The cardamom seedlings are planted on the ridges, two rows on each and at a distance of 9" to 12" between plants. A platform is erected about 5 feet high, of light bamboo or other available material. Palm leaves are spread on and tied to the bamboos, and these give sufficient shade and shelter. The irrigation water is so distributed that it trickles through all the channels continuously. The ridges are thus kept sufficiently moist, but not wet. In the monsoon the irrigation and drainage water must be directed as far as possible away from the nursery. The seedlings are kept in the nursery for 15 to 18 months. They are then about 4 feet high.

PLANTING.

Cardamoms are planted permanently in the garden at two seasons—from March to June or from September to October. They are usually planted in the same lines as the betel palm and intermediate between two trees. Pits 18" square and 18" deep are dug. Part of the excavated earth is returned to the pit mixed with leaf manure, the seedling is planted, and the pit filled up nearly level with leaf manure but the rhizome and roots should not be deeply planted. The leaves should be supported by one or two bands of plantain bast tied, in the case of each plant, to a stout wooden stake securely fixed upright in the ground. The leaves would otherwise be beaten down by wind or rain. The soil round each cardamom plant should be

regularly dug and weeded. It is asserted that vegetation of any kind does not freely grow under cardamoms. Each plant gets leaf manure in March and April annually if the supply is abundant, otherwise only every second year.

YIELD.

The plants are in bearing the year after being planted, but do not yield much the first year. The flowers come somewhat irregularly in April and May. The fruit forms during June and July, and in heavy rain should be protected by a light covering of leaves and branchwood. The capsules ripen irregularly, but mostly in September and October. Those on one scape should be collected as they ripen. They are ripe when they begin to change colour from green to yellow, and at this time should be full and firm. If the capsules are left until ripe, they split and shed the seed. Each capsule should be severed from the scape and not plucked. A portion of stalk should be left on each capsule. If plucked, the pressure of the fingers may burst the fruit. The fruit when gathered is dried in the sun for two or three days, and then hand rubbed in the sun to remove the dried calyx attached to the apex of each fruit. The drying should be gradual. Full exposure to the sun may cause the pods to split, and this damages the spice considerably. The capsules lose during drying considerable in weight and bulk. They are during exposure to the sun, to some extent, bleached. When quite dry, the produce is sold to dealers.

BLEACHING.

The dealers in their turn bleach the cardamoms for certain markets, also sort

and pack the produce suitably. The process of bleaching is as follows:—

A large earthenware vessel is filled with water into which pounded soapnut and acacia concinna in the proportion of 2 lbs., of the former to $\frac{1}{4}$ lb. of the latter for about 5 gallons of water are placed and well stirred. Another vessel contains a strong solution of common soap in water. The mixture containing 2 lbs. of pounded soapnut and $\frac{1}{4}$ lb. of acacia concinna suffices for 130 lbs. of cardamoms.

In bleaching the cardamoms about 10 lbs. in weight are put into a capacious vessel containing half full of water. These are then stirred vigorously for about a minute and then suddenly rest for about the same length of time, and again stir for another minute. A thick lather results. This completes the first washing. The cardamoms are baled out by hand and transferred to a basket, where they remain a few seconds till the water has drained off. The cardamoms are again placed in another vessel containing 7 quarts of pure water, 1 quart of the soapnut and acacia concinna mixture, and one of the soap solution. The cardamoms are stirred as in the first washing with the same interval of rest, and are baled out into another basket. When the water is drained off, the washed cardamoms are thrown on to a mat. The heap becomes large after a few hours' work. A labourer is exclusively in charge of it and continually sprinkles the well water over it. He is relieved at night by another operator who sprinkles the heap till morning, once every half hour. In the morning the heap is spread in the sun to dry. The next

operation is to nip off the short stalks. This is done with scissors. After this, the cardamoms are assorted according to their shapes and sizes suitable for market.

STARCHING.

Besides this bleaching, now-a-days cardamoms are starched. For this purpose the starch is prepared by pounding together rice, wheat, and soap with butter milk. The paste is dissolved in a sufficient quantity of water and the solution is sprinkled over the cardamoms to be starched as they are being rubbed by the hand.

MANUFACTURE OF PORTLAND CEMENT.

THE production of portland cement is the most important non-metallic constructive material used by engineers at the present time. Throughout the world this industry ranks among the first eight extractive industries, being exceeded in importance only by coal, pig iron, gold and stone.

Although the industry has expanded with great rapidity from the termination of the Great War, still India could not maintain her position until it has been rescued by the Government of India on the recommendation of Tariff Board.

Portland cement is a compound consisting chiefly of silicates and aluminates of lime, produced by the calcination to incipient vitrification of a mechanical mixture of chalk and clay; or similar materials containing the requisite chemical constituents the clinker thus produced being subsequently ground to a more or less impalpable powder. The process by which it is manufactured is

of twentieth normal sulphuric acid for every 10 grammes of dry spent flowers. Three lots of liquids were kept for fermentation. The first one was an extract from fresh flowers, the second was from spent flowers mixed with the extract of fresh flowers to make up the sugar contents necessary for the fermentation process with calcium carbonate to neutralise the acid. All the three liquids were started with the same specific gravity.

The actual quantities were as follows:—

(1) 354 cc. of the extract from original flowers containing 78.23 grammes of sugars and having sp. gr. 1.079 was diluted with water to 800 cc. The sp. gr. of the liquid ready for fermentation was 1.037.

(2) 250 cc. of the extract from the original flowers, containing 55.25 grammes of sugars was mixed with 750 cc. of the extract from the spent flowers with the sp. gr. 1.020 and containing 11.25 grammes of sugars. To this liquid 2 grammes of calcium carbonate were added to neutralise most of the acidity of the liquid due to sulphuric acid. The sp. gr. of this mixture when ready for fermentation was 1.037.

(3) 250 cc. of the extract from the original flower, containing 55.25 grammes of sugar were mixed with 750 cc. of the extract from the spent flowers, with the sp. gr. 1.020 and containing 11.25 grammes of sugars. The sp. gr. of the mixture when ready was 1.037.

Ferment was added to all the three liquids and the following observations were noted during fermentation:—

Number of hours after starting fermentation	(No. 1) 354 cc. of extract from original flowers diluted with water to 800 cc.		(No. 2) 250 cc. of extract from original flowers mixed with 750 cc. extract from spent flowers Neutralised with lime.		(No. 3) 250 cc. of extract from original flowers mixed with 750 cc. extract from spent flowers.	
	Observed Temp. of liquid F°.	Sp. gr. corrected to 84°F.	Observed Temp. of liquid F°.	Sp. gr. corrected to 84°F.	Observed Temp. of liquid F°.	Sp. gr. corrected to 84°F.
Beginning	84°	1.037	82°	1.037	82°	1.037
13 hours	79°	1.030	79°	1.0285	79°	1.0295
23 hours	87°	1.0155	87°	1.0185	87°	1.0175
38 hours	77°	1.0105	77°	1.0185	77°	1.0175
44 hours	83°	1.009	83°	1.018	83°	1.0175

The attenuation was quick where the acid extract from the spent flowers was added but the sp. gr. of the liquids with the extract from the spent went down only up to 1.0175 while sp. gr. of

original extract diluted with water went down to 1.009.

When these liquids were distilled the following results were obtained:—

	(No. 1) 354 cc. of extract from original flowers diluted with water to 800 cc.	(No. 2) 250 cc. of extract from original flowers mixed with 750 cc. extract from spent flowers neutralised with lime.	(No. 3) 250 cc. of extract from original flowers mixed with 750 cc. extract from spent flowers.
Acidity in terms of H_2SO_4 just before distillation — —	0.35 p.c.		0.48 p.c.
Corrected temperature of the distillate — —	83° F.	85° F.	81° F.
Corrected sp. gr. — —	95.8	96.8	96.8
Strength — —	92.6	95.6	94.8
	under proof	under proof	under proof
Percent proof spirit — —	7.4	4.4	5.2
Total quantity of proof spirit in the total liquid — —	59.2 cc.	44 cc.	52 cc.
Total quantity of absolute alco- hol in the total liquid — —	33.8 cc.	25.1 cc.	29.7
Total sugar in the liquid kept for fermentation — —	78.28 grams	55.25 + 11.25 = 66.50 grams	55.25 + 11.25 = 66.50 grams

Since 78.28 grams of sugars in the extract from original flowers gave 59.2 cc. of proof spirit or 33.8 cc. absolute alcohol 55.25 grams sugars would yield 41.8 cc. of proof spirit or 25.02 cc. of absolute alcohol and therefore the excess over 41.8 cc. of proof spirit is due to the extra 11.25 grams of sugars added in the form of extract from the spent flowers. In the case of the liquid neutralised with lime only 2.2 cc of proof spirit is yielded by 11.25 grams of sugars while in the case where the acid was not neutralised the yield from the same quantity of sugars is 10.2 cc. proof spirit. This yield is better than even the yield got by fermenting the extract from the original flowers

The extract from the original flowers was kept under same conditions under which it is usually kept on a large scale in the distilleries and therefore the results obtained in the above experiments

may be taken to be conclusive. The results were confirmed by other trials. It may now be stated that if the spent *mohwra* flowers are heated under three atmospheric pressure for four hours with sulphuric acid in the proportion of 0.122 grammes of sulphuric for every 10 grammes of dry or for every 100 grammes of fresh spent *mohwra* flowers (containing 90 % water) and the material pressed, then the extract contains sugars which are fermentable. This extract although it is acid can safely be added to the saccharine extract from the original flowers for fermentation. At present the extract from the original flowers which has generally its sp gr. somewhere near 1.080 is diluted with water to bring the sp gr. to 1.035. Now if the extract from the original flowers is diluted with the extract from the spent flowers, the additional sugars will all ferment and will yield a proportionately large quantity of alcohol.

Indian Trade Delegation To Afghanistan.

A TRADE Delegation was sent to Afghanistan by the Government of India towards the beginning of April, 1934, with the object of examining in consultation with informed opinion in Afghanistan the directions in which it might be possible to foster and expand the mutual trade between India and that country.

The Delegation interviewed several merchants interested in the Indo-Afghan trade. The chief object aimed at was to ascertain the commodities produced in India for which a market exists in Afghanistan and the steps which might be taken to promote an export trade in those commodities. The Delegation also examined the possibilities of the growth of trade in the reverse direction.

The Delegation notes with concern the establishment of a system of monopolies and the grant of these monopolies chiefly to Afghan subjects. The application of this policy automatically tends to the elimination of Indian and other foreign middlemen, and as a large share of the Afghan import and export trade was in the hands of Indian traders these have suffered considerably by this system of monopolies.

Monopolies have so far been granted for the import of sugar, petrol and motor oils, motor vehicles and their accessories, as well as for the export of fruits and almonds from Kandahar and Karakulis (Persian lamb skins). Of these the import monopolies have been granted in favour of the SHIRKAT-I-ASHAMI which company also possesses a large share of the monopoly for the ex-

port of Karakulis. The monopoly for the export of fruit from Kandahar has been granted to the SHIRKAT-I-PUSTAM, a company formed of Kandahar traders.

Rumours were heard by the Trade Delegation in Peshawar, Chaman and Kabul that the monopoly system would be extended to cover other commodities, and cotton piecegoods were specially mentioned in that connection. On the other hand in certain quarters grave doubts were expressed as to the ultimate success of the monopoly system. Until further experience has been gained of the working of the system it is not possible to give any definite opinion as to which of the above views is likely to prove correct.

India's trade with Afghanistan has also suffered to some extent by certain other recent measures of the Afghan Government. These measures are:—

(i) the abolition of "Chahar Yaka" tax;

(ii) the revision of the Afghan Customs Tariff; and

(iii) the restriction of the imports of goods classed as luxuries.

The prohibition of the imports of luxury goods such as silk, brocades, artificial pearls, etc., applies to imports from all countries and its object is apparently the reduction of imports as a step towards correcting the adverse balance of trade.

While this prohibition of imports and the monopoly system has circumscribed the opportunities for the development of the trade with Afghanistan in certain particular commodities, there still remain

by no means inconsiderable opportunities for the promotion of Indian trade in other directions. It is, however, essential that the Indian interests concerned should make themselves thoroughly acquainted with the precise requirements of the Afghan market, and take necessary steps to obtain first hand knowledge of the conditions prevailing there.

As a result of their observations in the Kabul and Kandahar bazaars, the Trade Delegation remark that the trade in Indian wares has hitherto been run on haphazard lines. No organised attempts have been made by Indian merchants to push the sale of their goods. Indian goods have hitherto enjoyed some preference over foreign goods passing in transit through India to Afghanistan by the imposition of the "Chahar Yaka" tax. The abolition of this tax has removed this preference and the abolition of yet another tax "Sarfiyat" of $7\frac{1}{2}$ per cent. on the transport of Afghan produce from places of production to distributing centres may have further adverse effect on Indian trade. If the position of Indian trade in the Afghanistan market is to be maintained, it is essential that Indian manufacturers should make special efforts to organise this trade properly. They should be prepared to send their representatives to Kabul to study the markets or at any rate to the frontier towns of Peshawar and Chaman to learn from merchants who are closely in touch with Kabul and Kandahar. The Afghan market is highly competitive and business is only likely to result from the quotation of competitive prices. It will also be obvious from what has been set out in the foregoing paragraphs that in

Afghanistan, as in other countries with an unfavourable trade balance, an expansion in import trade depends greatly on a concurrent increase in exports. If, therefore, the Indian trader can establish liaison with the trader in Afghanistan with a view to the encouragement of trade exchange rather than confine himself to the promotion of purely unilateral trade from India to Afghanistan, the opportunities for Indian products in Afghan markets will undoubtedly be improved.

The following observations of the Trade Delegation in respect of certain items of Indo-Afghan trade are of particular interest:—

Cotton Piecegoods.—The Afghan market and particularly the Kabul market, is mainly one for coarse goods, in which the Indian manufacturer should be able to hold his own.

Indian cloths include grey shirtings and sheets, striped shirtings, dyed and bleached shirtings, gabroons and bleached drills and twills—all of a coarse make. The most popular lines of Japanese goods are,—

Grey longcloth—No. 9797 and 'soldier' brand;

Bleached longcloth Nos. 9595, 6020, 2020;

Grey drill—"Three Dogs" brand; Striped shirting—S./52;

Mulls—No. 4030. and small lines of cotton flannels and voiles.

The above are specially mentioned as being of a type which are manufactured in India though under present conditions Indian mills are unable to compete with Japan.

Artificial Silk Goods—These come mostly from Japan, but lungis, and daryai from Ludhiana and Amritsar are found in considerable quantities. It is understood that lungis are also manufactured in Jalalabad, and it is possible that the abolition of the Sarfiyat tax mentioned above may turn the scale against the Indian article.

Woollen Goods.—Imports from abroad consist chiefly of "shoddy" cloth from Japan and Italy. It might be worth the while of Indian woollen mills to study this market. Purchases from these mills are, at present, mainly confined to khaki serge and blankets for the Army.

Cotton Yarn.—There is a fairly good demand for handloom purposes of counts 10s, 10/2, 20s, 20/2, 40s. etc. Yarns up to 20s. are at present supplied by Indian mills and yarns above 20s. are mostly imported from Japan.

Hosiery.—This is an expanding market, but has been captured entirely by Japan. There is very little chance for the Indian industry under present conditions.

Iron and Steel.—There may be an opening here for Indian manufacturers of iron and steel. The imports of corrugated and flat iron and country-made iron bars from India during the Afghan year 1310 were valued at 3,80,542 Afghani rupees.

Cement.—The use of cement is on the increase. At present Indian cement is chiefly used but Japanese cement is being offered at lower prices and it is suggested that the Cement Marketing Board might study the situation. The imports from India during the Afghan year 1310 were valued at 1,14,121 Afghani rupees.

Aluminium Goods.—Demand in this trade is somewhat limited as Afghans chiefly use copper utensils. The sale of such goods might be increased, if Indian manufacturers studied the market and

set out to make the type of utensils that are used by the Afghans. Such aluminium ware, as is sold now, is of Indian manufacture.

Cutlery.—A certain amount of cheap cutlery, i.e., knives, scissors, etc., made in the Wazirabad district were noticed in the Kandahar market. These were selling in competition with cheap foreign cutlery. This is a small line at present but it might be worth following up.

Soap.—India, with her large resources of vegetable oils, should be in a position to meet the whole requirements of Afghanistan and should certainly figure more largely in the market than she does at present. Washing soap to the value of 69,513, Afghani rupees was exported to Afghanistan from India during the Afghan year 1310.

Leather Goods.—Factories exist for making boots and leather equipment for the Army, but the output is not sufficient for the country's needs and in consequence considerable purchases are made from India. Such purchases include tanned leather and also harness and saddlery. Chaplis and gold embroidered shoes are imported in large quantities from Peshawar.

Tea.—A large amount of tea is consumed in the country, but green rather than black. It might repay study by the Indian Tea Association to ascertain how Indian tea could be made more palatable to the Afghan taste.

Paper.—The Delegation was informed that a Government contract worth some Rs. 3 lakhs Afghani was given to Germany, because Indian mills had failed to tender. There appeared to be a definite preference in favour of Indian paper but a case was quoted in which an Indian manufacturer had failed to deliver goods according to sample.

Spices.—The trade in spices in Kabul, although not very large, is one in which India has a very considerable share. In ginger, pepper, tamarind and turmeric, India holds a virtual monopoly.

WHEN RETURNS DROP.

IN ALL business campaigns there comes a time when the returns drop. Usually it is difficult to assign a reason for the decline, but the reason must be found, and quickly, for it is not possible to continue a business at a loss for long. Not only must the trader keep a keen eye upon the business and profits his efforts bring in, but as soon as returns drop, below normal, he must be able to find the cause without delay. The following items should demand a searching enquiry:—

1. The goods.
2. Media
3. The advertisements.
4. Competition.
5. Prices.
6. The buying prices.

THE CAUSES OF DECLINING BUSINESS.

Let us examine those things in detail. First of all the goods. There is just a possibility that they may not be quite what the people are wanting at the moment.

Next comes media. If your advertisements have been running for some time there is a remote chance that you have sold to most of the prospects who read the papers you have been using. Possibly it will be wise to try a new list but it may well be that you are not using your space to the best advantage. Perhaps the setting of your advertisement attracts the attention of only a few of the readers of the paper, and very likely the selling talk fails to impress.

The average reader may be so used to seeing your announcement that it has little more than a subconscious effect upon his mind.

After this comes the competition of firms in the same line of business. You should watch the values they offer. If these are good, you can avoid their most energetic onslaught by offering wanted goods which they are leaving alone at the moment.

Next come prices. Yours may be too low or too high, and your offers may not be correctly adjusted to the various papers you are using.

Lastly, the buying public. When a boom is on, cost of living may be high but the family income is also high. When a slump comes, the cost of living may be small, but so also is the family incomes and with it the family's possibilities of purchasing the goods you are selling.

BOOM AND SLUMP PERIODS.

No man can accurately forecast what response there will be to a definite expenditure on advertising, over a given period; despite the best laid plans, returns will drop occasionally and even research work which points to the reason why, provides little consolation.

It is necessary to regard conditions as being either abnormal or normal, and we can divide the abnormal periods into, two classifications; (1) "boom" (2) "slump."

In the period immediately following the war we had a boom. Every body's pockets were more or less well-filled and people had money to spend on luxuries.

During that time many of our larger mail order advertisers developed the spending habit, appropriating enormous sums of money for advertising. This paid them, as it was sure to do, for the responsiveness was sensitive to a remarkable degree. The public having plenty to spend readily.

Gradually the family income decreased. This was hardly noticeable for quite a while and those large firms who have been used to squandering terrific sums on advertising each year still continued to do so.

They reasoned that they had only to spend enough to attract a profitable business, but the time eventually came when they found that, no matter how

active their advertising might be, results were disappointing.

If, advertisement fails to bring immediate cash returns, it means loss, and the longer this unprofitable expenditure continues, the greater this loss naturally is. So as the slump period developed a state of persistent inertia, many firms almost became convinced that advertising has lost its power to attract trade.

If they had spent less and thought more, they would have saved huge sums of money, because it follows that, no matter how strong the magnet is, it will not draw iron filings out of an empty box.

BUSINESS METHODS FOR ABNORMAL TIMES.

Slump times and boom times are very anxious times for all the advertisers. When a boom is on, the greatest difficulty lies in the direction of building an organisation to handle a rapidly extending business, and building with such ease that the said organisation is not found to be unwieldy when the normal time comes into its own again, for overgrowth means loss.

In the case of a slump, at the beginning most people are hopeful. They think it will not last long, and they go on spending; there is nothing seriously wrong with this provided they do not keep up the spending process for too length a period. Directly there is evidence that a slump has set in, steps should be taken to restrict the advertising campaign.

The expenditure should be cut down in all directions consistent with reason. Naturally it is essential to keep the name and goods well before the public, so that the cumulative force of advertising which builds goodwill and prestige may not be entirely lost.

This is the formula which every advertiser should bear in mind.

When the demand is rising, speed it by means of advertising; when sales are booming, maintain them by means of advertising, and when sales are falling, stimulate them by means of advertising.

Having determined how much you invest in a campaign of advertising

over a given period the next thing is to get experienced help in mapping out the spending to the best advantage, always setting on one side a sufficient reserve against the day when results begin to diminish.

This work calls for analysis, imagination, an understanding of human nature, and a more than superficial acquaintance with the advertising value of newspapers, magazines, etc.

MAIL ORDER CAMPAIGNS.

Possibly time is of great importance in the "Mail order" field than in any other phase of advertising for it is always necessary to plan in advance and be ready for those seasons when selling is most active. It is therefore necessary to work to a time-table and it is absolutely essential that every move should be planned long in advance.

But nearly every "mail order" advertiser is a procrastinator. He keeps putting off the evil moment with two result that his work is done in a hurry and there is no time for serious thought, and it is often the case that a really effective job is spoiled because it has to be rushed.

For example, if the mail-order man is a dealer and not the actual maker of the goods he sells, he will require to buy in advance. If he is a manufacturer, he must naturally make a stock of goods he is to offer ahead of the time when they will be in demand, though in order to avoid accumulating a collection of lines which do not sell he takes a conservative policy with regard to this, most likely concentrating on a strictly limited number of lines.

This shows that organisation, system and method provide the fundamental basis on which profits are built.

It is also desirable on the part of the mail-order men to keep an eye on what other firms are advertising throughout the year.

As a further help a sales chart may be constructed. This will give a bird's eye view of the movements for the period of a whole year,

IN THE INSURANCE FIELD.

BY OUR INSURANCE COMMISSIONER.

An Ignored Fundamental.

It has been often said that the ideal of a life insurance company in regard to the underwriting of new business should be guided by considerations of "quality" and not "quantity" alone. The subject is indeed hackneyed, but still demands emphatic repetition. Reference to this aspect of the current Balance Sheet of the British Offices which brings the matter once more to the front. The situation is particularly embarrassing in America where the egotism of the managers finds its expression in the accumulation of new business much more than maintaining the just proportion of costs on the heads of new business and renewal business. Some of them are stubbornly blind in their attitude to facts, and are not equal to the liability which a large volume of business secured at a high cost would involve. Production alone is not the aim of life insurance to achieve; it is protection. Such protection, however, can be offered by life insurance only by extending its function to ever-increasing numbers of people seeking it. So production also plays an important part in the successful operation of life insurance, but mere acquisition of new business irrespective of its character fulfils no useful purpose; it renders no service to the policy holders nor to the companies. The public also ought to know and judge for themselves that the company which writes the largest volume of business is not necessarily the best, just as a man who can eat the most is not necessarily the most healthy. A life office is nothing short of an organism. Its health depends on the successful co-ordination and sound working of its various limbs and organs. Production is only one such limb. While the consideration of cost reigns supreme in the production department, the consi-

deration of investment is of the highest importance in the renewals department. The best life offices separate these two important branches into water-tight compartments, since their functions are entirely different from one another. While in the production department there is the need of an organisation talent, in the renewals department it is the investment talent that counts most. It should not always be expected that both these talents will be combined in a manager. That is the reason why we sometimes find that the services of an agency manager or of a financial advisor are availed of by the manager of a life office who is not always a genius. But the combination of these two essential departments of a life office may give rise to numerous complications in accountancy by which the company may successfully carry on what is called "window dressing." The company may well avoid giving a correct account of its cost of procuration on new business and on the renewal business. There is often such overlapping of expenditure on these two heads that confusion can be easily brought in. The voice of experience, however, says that the interests of the company as well as the policy holders are best served by adhering to the principle of low costs and sound investments whereby continued protection could be offered to those who are seeking protection. Let our companies be not misled by the siren voice of the production plan.

Plea For an Arbitration Bureau.

I venture to make a suggestion, however late it may be, to the special officer for Company Law reform in India, for the establishment of an Arbitration Bureau as a provision of the new Insurance Act. One who is conversant with the nature of correspondence of an insurance office

surely knows how many complaints, requests for information, misunderstanding between policyholders and companies, grievances against agents, brokers and fraudulent companies arrive by every mail. It does not repay, in the majority of cases, the costs of resort to a court of law, so the public are left with no other alternative than to appeal to the companies themselves. Some of the more serious cases are, however, referred to the Editors of insurance journals seeking publicity of the respective grievances in order to bring pressure on the persons or companies concerned. This gives rise to a very pernicious situation threatening the progress of life insurance to a considerable extent. The establishment of an arbitration bureau under the auspices of the Government may solve these problems very effectively, and exercise a healthy influence on the general conduct of agents and brokers. The existing insurance associations and institutes lack that authority which can enforce all companies to submit to a general scheme of control. Besides, the associations have no control whatsoever on the agents and brokers who might be found guilty of professional misconduct. It is only the Government that can enforce a general scheme of control over the companies, and take proper steps to settle disputes, redress grievances and afford protection accordingly as they are needed. It cannot be denied that the public have a right to make complaints and to demand redress of injustice that might be done to them. The bureau may ask for a small fee from every complaint not for meeting the cost of administration but for limiting the complaints only to bonafide and genuine ones. The experiences of this bureau will undoubtedly suggest the weaknesses of the law, the lines of reform, and afford ample opportunities to the companies for a better administration of their affairs. Wicked agents can be brought to task, insolvent companies may be exposed and fraudulent policy holders may be punished. The nature of work of this bureau will be entirely dif-

ferent from the functions of a claim bureau which is more or less a private undertaking engaged in legal profession. The need of an unbiased third party having the power to enforce its decisions and serving as a mediator between contending persons and groups of persons will, I hope, be seriously considered. The success of such Arbitration Bureaus in several American States suggests that a lot of benefit may be derived from its establishment and successful operation in India.

Insurance Education through Commercial Films.

The utility of commercial films as a medium of insurance education (for the public, not for agents) is immense. The propaganda till now is conducted by advertisements in newspapers, posters and pamphlets which seldom reach the persons they have in view, and hardly at the proper moment. Every adult visitor to the cinema, on the other hand, is a prospective client, and is in a more receptive state of the mind than when he is in office or at home. The manufacturing industries have already taken advantage of the educational possibilities of the film, and the usefulness of their various products is delightfully presented in short subjects. The Metropolitan Life Insurance Company of New York, however, has taken a lead in the matter in America. The themes are based on accidents on American streets, the carelessness of the motorists, of the pedestrians, and various other subjects. A film entitled "Once upon a Time" takes the audience into a land where such familiar personages as Simple Simon, Cinderella and other characters beloved of children, and portrays in humorous fashion many of the hazards of life against which insurance is designed to protect the mankind. These films often make a lasting impression on the cinema visitors and achieve much more than an organised sales talk or a coloured poster would be able to do. May we expect that some experiments with the film will be conducted by our leading life offices?

SMALL TRADES & RECIPES

Eczema Ointment.

Lanolin	200 oz.
Petrolatum	200 oz.
Beeswax	50 oz.
Phenol	5 oz.
Camphor	10 oz.
Oil of eucalyptus	50 oz.
Salicylic acid	10 oz.
Perfume to suit	q. s.

Tooth Powder.

Magnesium carbonate	425 gr.
Precipitated chalk	560 gr.
Borax	55 gr.
Sodii Bicarb	45 gr.
Soap powder	50 gr.
Sugar	90 gr.
Methyl salicylate	8 c. c.
Menthol	1 gr.
Oil of cinnamon	2 c. c.

Dissolve the menthol in the methyl, add the cinnamon and then add and mix with sugar. Add soap, borax and mix thoroughly. Add the chalk and mix and finally add the bicarbonate and the magnesium carbonate. Mix thoroughly and sift.

How to Make Wax Crayons.

A good grade of wax marking crayons may be made in any desired colour by melting together tallow, 90 parts, rosin, 2½ parts and rosin soap, 1 part. While the mixture is molten the colouring pigment should be stirred in. Almost any dry colour may be used, such as prussian blue, red iron oxide or chrome yellow. The coloured mixture is then poured into moulds, which may be short glass tubes. Wax drawing crayons may be cast from a composition made by melting together hard castile soap, 8 parts, beeswax crude, 6 parts, burnt umber, ½ part and prussian blue ½ part, all by weight, are added and worked into the waxes until an even consistency is produced. The finished material is then poured into hot moulds and cooled quickly by plunging into cold water.

Bleaching Lotion.

Citric, acetic, and lactic acids are effective skin bleachers, and a lotion containing these substances is easily prepared according to the following formula:—

Citric acid	150 grains.
Acetic acid	80 mins.
Lactic acid	120 "
Alcohol (90 p.c.)	400 "
Diethyleneglycol	
monoethyl ether	400 "
Triple rose water	
sufficient to produce	8 fl. oz.

Dissolve the citric acid in the alcohol. Mix the lactic acid with most of the rose water; add the citric acid solution and mix. Mix the acetic acid with the diethyleneglycol monoethyl ether and incorporate this with the other mixed ingredients. Adjust to volume with the rose water, add colour if desired.

Cements to Repair Metal Objects.

Metal objects may be repaired by using one of the following preparations: Marine glue is one of the most effective cements for metal and can be made by mixing shellac with rubber cement. If the latter is not at hand, it may be made by dissolving para rubber, (not vulcanized or scrap) 1 part, in benzene, 10 parts. For most purposes, asphaltum may be used in place of or in addition to the shellac. This cement will keep well if tightly corked. If it becomes too thick, benzene may be added as a thinner. Another excellent metal cement that is also useful for filling cracks is made by adding whiting to water glass until a viscous putty-like paste is formed. It dries very hard and will not deteriorate. When used as a filling material, this cement should be made very thick. It may be coloured with almost any dry pigment, and if thickened with whiting, the cement may be used for modelling.

India's Industrial Progress.

Progress of New Industries in the Bombay Presidency.

During the year 1933-34 several new factories were established in the Bombay Presidency. A factory for the manufacture of biscuits and another for envelopes were established in Karachi. Similarly, a factory for the manufacture of bicycle tubes and car tyres was also established in the same city. Hosiery factories were established in Sukkur and elsewhere.

New factories were also started in Bombay and the Presidency such as electro-plating and electro-galvanizing, manufacture of tricycles, spares for bicycles, bakelite accessories, both electrical and toilet purposes, pressure die castings of non-ferrous metal, vitrified metal sign boards, freezing of marine products, manufacture of dry cells, batteries and accumulators' metal screws, laboratory apparatus, time-pieces and clocks, hollow-ware, pumps, oil engines etc.

Agricultural Research in U.P.

An elaborate scheme of research has been laid down by the Department of Agriculture of the United Provinces. In his report for last year the Director says that agricultural and horticultural research of the Province is mainly conducted by three economic botanists, a plant pathologist, an entomologist and an agricultural chemist and their staffs. An agronomist is shortly expected to be appointed. The primary object of the

research, so far as sugarcane is concerned, is the trial and selection of varieties giving the highest sugar tonnage under various conditions. Rice research at Nagina, which is financed by a grant from the Imperial Council of Agricultural Research, continues to make most satisfactory progress. During the year research was also carried out on pests of sugarcane, lucerne, mango, and apple trees, and upon fly breeding under different conditions of compost and farm-yard manure preparations. The demonstrational and experimental control of pink-bollworm was continued in the contiguous areas of Roorkee and Najibabad tahsils of Saharanpur and Bijnor districts and in Aligarh districts. The work on medicinal plants was continued. Drug plants collected from the Himalayan tract of Garhwal were planted and observations on them are under progress.

Bauxite Ore Find.

Extensive deposits of high quality bauxite have recently been discovered at Tungar Hill in the Thana district, about 30 miles from Bombay. Bauxite is the ore from which aluminium is produced and its discovery so near to sources of electric power suggest possibilities of a new industry for the Presidency. Although there are vast deposits of bauxite scattered throughout India, the absence of cheap electric power in the vicinity has prevented their exploitation. It is a rare coincidence that high class

deposits should be found near a hydro-electric plant, and that the plant should be working to only part capacity so that surplus power is available.

Ten-Year Plan for Ceylon.

In connection with issue on Economic Planning for India, it is interesting to note that a step in the way of Ceylon's economic progress is the introduction of the Statistics Bill in the near future by the Executive Committee of Labour, Industry and Commerce. The Bill is to be the foundation of the economic survey, recommended by Sir Sorabji Pochkhanawala in the course of his report on Ceylon's credit and banking facilities, and will help to gather all information necessary for the resuscitation of trade and industry in the Island. Behind the proposed economic survey is a ten-year plan of economic reconstruction which the Executive Committee proposes to plan. For the ten-year plan, much of the preliminary spade work has already been done. The first step was the survey of the Banking Commission under Sir Sorabji Pochkhanawala. The second step was the engagement of the services of Mr. H. G. Champion of the Forest Service in India to undertake a survey of Ceylon's forests in order to exploit their wealth scientifically. The third step was the arrival of Mr. G. Guha from Bengal to undertake an industrial survey in order to explore the possibilities of starting industrial enterprises based on the island's raw products.

Agricultural Research Scholarships.

It was announced on June 7, 1933, that the Imperial Council of Agricultural Research would award annually one gold and two or three silver medals for improvements of distinct merit in the sci-

ce and art of agriculture and animal husbandry of an all-India importance, and that awards would be made each year in one of the five groups namely, veterinary scientific instruments and appliances; dairying and care of animals; field implements and appliances; machinery for preparing crops for market, for food or for storage; and water lifts. In accordance with that programme applications are now invited for the award of prizes during 1936 for improvements in field implements and appliances. Entries will be submitted in the first instance to the provincial agricultural research committees, which will forward to the Council those which they consider the most suitable and also a description of rejected entries. Entries for the award should reach the Secretary, Imperial Council of Agricultural Research not later than December 1, 1935. Entry forms and the conditions to be fulfilled can be obtained from the Secretary, Imperial Council of Agricultural Research, Simla.

Development of Industries.

A plea for ushering in an era of intensified industrial activity in India with a view to relieving the pressure on agricultural occupations and diverting human energies to remunerative and useful occupations was made by Mr. Hosseinbhoj A. Laljee while addressing the sixth annual meeting of the Indian National Committee of the International Chamber of Commerce.

Referring to the Indo-British Trade Agreement Mr. Hosseinbhoj said that there was no reciprocity in it and the power given under clause 4 of the protective duties levied against British imports, introduced a "vicious" principle in the tariff policy of the country.

India had a large exportable surplus of raw materials and with the diversion

of her import trade consequent upon such agreements, difficulties would be experienced in maintaining her export trade with other countries. It was, therefore, necessary that in the matter of such trade agreements in future, greater consideration should be given to the consequent displacement in India's export trade with other countries.

Industrial Museums.

It is understood that the Government of Bengal (Ministry of Industries) have given a careful consideration of the recommendation of the Divisional Commissioners' Conference held with a view to bringing into prominence the industrial potentialities of each district of Bengal, and they have come to the conclusion that in the present stage of development of cottage industries in the province, the establishment of District Industrial museums provides one of the best means by which the marketing and consumption of local produce can be stimulated. Moreover, the success of the Unemployment Relief Scheme, which it has been possible with the active assistance and co-operation of the District Boards to introduce in the several districts of the province in which it is now working and which it is hoped to put into operation in the remaining districts later largely depends on the efforts made to secure facilities for the marketing of products of the cottage and small industries.

U. P. Agricultural Research Committee.

In a meeting of the U. P. Agricultural Research Committee held recently in the Council House, Lucknow the following schemes were recommended for consideration of the Imperial Council of Agricultural Research:

The scheme by Dr. N. R. Dhar, Head of the Department and Professor of Chemistry, for research into nitrogen loss from the soils and nitrogen fixation in soils on the application of molasses and other carbonaceous substances estimated to cost Rs. 32,400 spread over five years.

The revised U. P. Government scheme for practical research into the feeding of cattle at the departmental

farms, estimated to cost Rs. 1,34,600 spread over five years.

The U. P. Government's application for continuing the study of sugarcane seedlings at Shahjahanpur the initial scheme of which was sanctioned by the Imperial Council of Agricultural Research in 1930 estimated to cost Rs. 9,924 spread over five years.

The scheme of Dr. Radha Kamal Mukherji for investigation of changes of crops and crop rotations in the U. P. was referred back to the author for alteration to a comprehensive three year scheme in association with the King George's Medical College, Lucknow.

Bengali Linotype Machines.

Printing in Bengali had hitherto been labouring under a severe handicap in having to be managed without any mechanical device as in the case of printing in English.

It therefore gives us pleasure to learn that arrangements for Bengali Linotype machine have now been completed by Mr. Suresh Chandra Majumdar, Managing Director of the Ananda Bazar Patrika and that the machines in their perfected form will make their appearance in Calcutta by the end of August next.

Mr. Majumdar succeeded in completing the key-board by the middle of March last, when the whole scheme was subjected to the scrutiny of Prof. Norman Brown of the Pennsylvania University, U. S. A., who acted on behalf of the Mergenthaler Linotype Company of New York. Both Prof. Brown and Mr. A. J. May, Manager of Linotype and Machinery Ltd., Calcutta, expressed satisfaction with the arrangements in Mr. Majumdar's scheme. A few days back the American Company cabled to the Calcutta office of the Linotype machine saying that the arrangement of the Key-board had proved satisfactory and also sent sample prints from the Bengali matrices for approval. Mr. Majumdar has approved the same and requested the New York Company to expedite the work of completing the production of the machine.

Scientific & Technical Topics.

What is Rotenone?

Scientists are not unduly eager to discover where flies go in the winter-time, but they are very concerned with what becomes of them in summer. Being carriers of disease everyone wishes to see flies exterminated and with this end in view many interesting experiments have been done lately with a substance named rotenone.

Rotenone (whose chemical formula is $C_{21}H_{22}O_3$) is an insect poison derived from Derris Root. It is quite harmless to man, animals and birds. However, for destroying insects—greenfly, for instance—it is fifteen times as powerful a poison as nicotine, and is intensely poisonous to fish. One part of rotenone in 13,000,000 parts of water will kill goldfish.

It is being increasingly used in fly sprays and insect powders with successful results, and speaking generally, it may be used for destroying any kind of insect life.

In order to demonstrate its harmlessness to man, a gentleman named Haag recently swallowed $2\frac{1}{2}$ grains of rotenone without ill effects. Most of us are willing to take him at his word and prefer not to chance it ourselves.

A Very Rare Form of Carbon.

In addition to the well-known forms of carbon—soot, graphite, diamond, etc.—there is another extremely unusual modification which was prepared by ac-

cident some years ago and which is being used extensively in modern industry.

Normally when hydrocarbons are burnt they give carbon dioxide gas and water vapour on complete combustion, with soot as an additional product if there is insufficient air. With a large excess of air no soot or carbon should be produced.

It was found, however, that when methane was burnt with a large excess of air a few per cent of the total weight of carbon in the methane molecule was deposited as a very fine powder. This powder looked just like ordinary soot carbon and chemically was in fact no different.

Physically, however, there was a vast difference, this dust being in particular extremely hard and abrasive. It was found to be invaluable as a rubber filling and it is to this material that motorists owe the long life and resistance to abrasion of the present-day tyre.

Consequently attempts were made to produce larger yields by reducing the amount of air used in the combustion. The product obtained was larger in quantity and looked just the same, but it possessed none of the unique powers of the dust. Therefore this carbon is produced in small quantities, but it is so unique in its properties (there is no substitute) that it is an extremely paying proposition to do so.

Naturally explanations have been sought. The most reasonable is that an occasional atom of carbon in the meth-

ane molecule does not react with oxygen, owing to molecular inactivity or similar reasons. It is therefore deposited to form this dust of "atomic carbon."

Feeding Fruit-Trees With a Bottle.

The rearing of young lambs by feeding them with a bottle is by no means a new idea, but the feeding of fruit-trees in a similar manner is distinctly novel. Experiments on these lines have been recently carried out successfully by the East Malling Research Station, and perhaps the time is not far distant when every fruit-grower will feed his trees in this manner.

In the experiment, those parts of the fruit-trees which could be seen to be lacking vigour, had a small hole made in the branch into which one end of a tube was placed. The other end of the tube was connected to a inverted bottle fixed, higher up, to the tree. The bottle contained a solution made up of a carefully calculated quantity of whatever chemical was necessary to supply the right food needed to bring about correct growth of the tree.

This method of feeding proved successful in the experiments and it indicates certain advantages over the usual way of feeding by applying plant-foods to the soil, it being direct, less wasteful and much quicker in action. In a similar fashion, water was supplied to trees during the drought of the past summer.

New Form of 'Heavy Water.'

After two years of extensive research Mr. J. B. M. Herbert, Lecturer in Physical Chemistry at Manchester University, and Hof M. Polanyi also of Manchester University have succeeded in producing water containing heavy oxygen in appreciable concentration.

Heavy oxygen water was first isolated two years ago by Prof. Hertz in Berlin. It is contained—like heavy hydrogen water—in ordinary water, in the proportion of one part in 500, but is very difficult to isolate.

It is separated by passing the vapour of ordinary water through an intricate apparatus of glass and porous clay tubes.

At present the apparatus is capable of producing only 20 milligrams (1-3 grain) of heavy oxygen water per day.

The chief advantage of heavy oxygen is that it will facilitate research into advanced organic chemical reactions. Heavy oxygen is readily distinguishable from the normal variety, and it will thus serve to indicate what is happening at any point of a chemical reaction.

"The heavy water we have produced so far contains only a very small percentage of heavy oxygen, but we are trying to obtain samples containing one per cent."

Flying Car.

Samuel Nystorm, a native of Sweden, has just had a very remarkable invention accepted by the Patents Office. This is a vehicle which is equally suitable for travel by air or road. It has a body like that of an ordinary car, but is fitted with a propeller, a rudder, and a tail plane.

These wings of this vehicle are pivoted in the centre and can be brought round so that they fold together on the roof; the engine is arranged to drive either the wheels or the propeller.

Special wheels for landing purposes are fixed, but can be drawn up underneath the body during road travel.

Soap-and-Water Cure.

No one would think that soap and water would help to cure pneumonia; but it does. Two doctors, V. G. Walsh and A. G. Frazer, have been working for six years on the problem, and have hit upon a solution of olive oil, soap and water, which, if injected into the blood stream, cuts down the period of crisis from seven to two days and enables the patient to be up and walking within ten days. In each of the early cases treated, the patient has been out of danger within forty-eight hours. This treatment, incidentally, has been 100 per cent. successful in cases of septicaemia, erysipelas, and rheumatic fever, but discoverers are doing some more research work before broadcasting the details of their discovery.

Formulas, Processes & Answers.

Solid Disinfectants.

213 K. J. D., Bombay—Desires to learn a recipe for preparing solid disinfectants.

Chloride of lime	490 lbs.
Ground naphthalene	70 lbs.
Turpentine	1½ gallons.
Eucalyptus Oil	1 pint.

Mix the oil with the turpentine, then add to the two others, and pass through a sieve to mix them well.

Celluloid Varnish.

209 A. L., Secunderabad—Wants a formula for celluloid varnish and also the process of manufacturing liquor ammonia.

Celluloid	10 parts.
Acetone	50 parts.
Amyl acetate	50 parts.

Mix and dissolve, when it will be ready for use. The ingredients are very inflammable so that care should be taken to keep the varnish away from fire.

Liquor Ammonia.

There are various methods for obtaining pure ammonia solution of sp. gr. .880 from crude liquor obtained as a by-product in the manufacture of coal gas. The methods consist essentially in redistilling the latter after addition of excess of lime, and, after freeing the vapour as much as possible from water by means of a reflux arrangement, passing it over lime and wood charcoal contained in suitable vessels, and then into pure water.

A simple arrangement for the manufacture of pure liquor-ammonia consists of an ordinary boiler fitted preferably with a reflux arrangement and connected with a series of tanks made of iron or wood lined with lead, and containing trays of slaked lime. Beyond these are a series of absorption vessels. They must be provided with a hydraulic inlet valve to prevent regurgitation, and with taps for drawing off the strong liquor into carboys. The boiler is charged with crude ammonia liquor mixed with a large excess of milk of lime. The absorbers are charged with pure water.

Preparation of Sheep Casings & Guts for Market.

3609 B. N. C., Lahore—Desires to know the method of preparing sheep casings.

Casings are usually purchased direct from the slaughter houses and treated without delay. After the fat has been carefully cut off they are turned inside out, scraped clean with a wooden scraper and well washed. One of the open ends is then tied and each gut is blown, and when the other end has been tied is sun-dried. When dry they are deflated, bound up in bundles of 100 Klafters or 200 yards, packed in cases and pressed. A half case usually contains about 10,000 yards and a full case about 20,000 yards. The process is the same in the case of salted casings upto the point of inflation; in lieu of inflation the casings are sorted

and packed in casks known as tierces in brine.

Coffee Tablets.

3768 S. N. C., Palghat—Wants a recipe for preparing coffee tablets.

Fresh cow's milk	20 lbs.
Water	6 lbs.
Coffee	24 oz.
Sugar	6 lbs.

Dilute the cow's milk with the water. Infuse the mixture with 24 oz. of any good coffee. Boil gently over a mild fire for a few minutes and then strain. Add to the filtrate the refined sugar and thicken it by boiling down. Stir continually until it is pasty and then pour into a buttered mould of tin. Allow to cool and solidify and then cut into pieces of desired size and weight. They should be immediately canned into tin pots without touching by hands. To use these tablets subsequently dissolve a cube in a cup of hot water and drink.

Gramophone Record Composition.

237 M. C. W., Calicut—Wants a formula of gramophone record composition.

Cellulose acetate	250 parts.
Triphenyl Phosphate	50 "
Diacetone alcohol	35 "
Triacetin	10 "
Acetone	1250 "
Aluminium oxide	35 "
Asbestos powder	q.s.
Magnesium oxide	q.s.
Mix.	

Preserving Mango.

278 D. N. R., Pudukotah State—Desires to learn a process of preserving mango.

Experiments in preserving mangoes were once carried out by the agricultural department and the results of such were published in an issue of the Agricultural Journal of India.

The mangoes after plucking from a tree were kept with their stalk coated with paraffin. These were then divided into three series and kept at different temperatures as follows:—

(a) at room temperature. (30°-32°

C) in a dealwood box.

(b) at 25°C incubator.

(c) at 10°C. "Frigidaire."

Some of the mangoes were allowed to ripen to a half ripe stage (i.e., the green colour of the skin was allowed to be changed into light yellow) at the room temperature before they were transferred to 10°C. "Frigidaire" whilst others were allowed to ripen fully to acquire the yellow colour and softness to the touch and a fine flavour, and then transferred to 10°C, the object being to determine the different periods upto which they could be kept in the cold storage at the various stages of ripeness.

One point which emerged from these experiments was that paraffining the stalk end did not prevent rotting. Mangoes kept at 25°C ripened almost in the same time as those at room temperature, viz., in 6-8 days. On keeping them for a longer period at these temperature black patches appeared here and there on the skin and eventually the whole fruit got rotten. No difference could be made out, between the paraffined mangoes and the control ones without paraffin.

It was also observed that if, by chance, during storage or in handling,

mangoes came in contact with any hard surface or suffered any pressure by fingers, depressions with black spots appeared at these particular points, where later on rotting started. Hence particular care had to be taken in wrapping individual mangoes with a piece of tissue paper and storing them on a soft bed of cotton or other packing material.

Once the mango is completely ripe, death of the cells takes place and saprophytic fungi and bacteria gain access and attack the sugar, setting up fermentation and rot. This latter could be delayed to some extent by keeping them at 10°C but it could not be completely stopped.

Fully ripened mangoes removed to 10°C in the "Frigidaire" kept well for 3 weeks after which time they lost their distinctive colour of ripeness and the skin gradually assumed a brownish black tinge; the flavour and taste were not, however, affected in any way. When they were kept for another week more, they got overripe and lost flavour also. On the other hand, those which had partially ripened at room temperature before being transferred to 10°C kept well for over 6 weeks, both in appearance as well as in flavour, probably owing to the ripening process being retarded by the low temperature. A shrinkage of the skin took place slowly but no rot set in, unless some injury was caused to the cells by pressure or impact on any hard surface. Such half-ripe mangoes kept at 10°C on the 23rd. June, 1928 were quite good in appearance and flavour when cut open on the 10th August, i.e., after a lapse of 7 weeks.

In the case of raw mangoes stored at 10°C the ripening was uneven. Some

of the mangoes normally ripened after a month others did not, the ripening depending upon the state of maturity attained by the fruits when they were plucked from the tree.

Capsules.

302 A. & S I., Bombay—Wants a recipe for making capsules.

Elastic capsules are formed from a composition consisting of a basic mixture of gelatin 400 and glycerin 100 parts to which is added a mixture of about .02 part of petroleum and about .04 part of benzoin-resin, and the capsules are hardened with a 3-5% formaldehyde solution to which glycerin and alcohol are added.

Milk Chocolates.

359 R. M M, Sukkur—Wishes to know the process of manufacturing chocolates.

For the manufacture of chocolate 3 machines are required. The mixing boiler, roller, and moulding tables. The mixing boiler consists of a round trough of granite provided with a mixing apparatus. The cocoa is intimately mixed with a corresponding quantity of sugar and other ingredients, the warm, soft mixture divided into lumps of a determined weight, and placed in tin moulds upon a shaking table. The soft mass, by this motion, spreads out uniformly in the moulds, and the air bubbles enclosed in it escape. The chocolate in cooling off contracts and detaches itself from the sides of the mould. Good chocolate forms a brown homogeneous mass of great density. The surface of the cake should have a dull lustre, and, when broken, the fracture, in cool weather,

must be sharp and show no lustrous or white granules.

Starch, either 2 to 3 per cent. of arrowroot or other starch, or 4 to 6 per cent. of kiln-dried wheat or barley flour is added to almost every kind of chocolate. (This adulterant is frequently added in much larger proportion.) Vanilla, spices, and other flavouring substances are also added.

We give in the following a number of receipts for manufacturing different varieties and qualities of chocolate:

I. Ordinary chocolate. Mix 2 pounds each of roasted and ground cocoa and pulverized sugar, and $\frac{1}{2}$ ounce of powdered cinnamon.

II. Mix $6\frac{1}{2}$ pounds of roasted and ground cocoa, a like quantity of sugar, 1 ounce of powdered cinnamon, a like quantity of rice roasted light brown, $\frac{1}{2}$ ounce of cardamoms, and $\frac{1}{4}$ ounce of cubebs.

Spiced Chocolate. Twelve hundred and fifty parts of roasted cocoa and a like quantity of sugar.

The cocoa is ground very fine, at a moderate heat, until it forms a thin paste. It is then mixed with the sugar and the following ingredients, all finely powdered:

Fine cinnamon	18 parts.
Cloves	9 "
Cardamom	4 "

The mass is then pressed in moulds.

Other Receipts for Spiced Chocolate.

Roasted cocoa	2000 parts.
Sugar	1750 "
Ceylon cinnamon	50 "
Cloves	$1\frac{1}{2}$ "

Vanilla ground with	
sugar	50 parts.
Cardamom	$1\frac{1}{2}$ "
Mace	$\frac{1}{2}$ part.

Preserving Milk.

S. M. S., Calcutta—Wants processes for preserving milk.

(1) Add to milk evaporated to $\frac{1}{3}$ its volume at a temperature of 100° to 120°F. , in a vacuum, a solution of benzoate of magnesium and preserve the mixture in a hermetically closed vessel.

(2) The addition of a small quantity of boracic acid to milk retards the separation of cream, and the milk retains its sweetness for several days.

Hair Lotion.

460 B. C. B., Basrah—Desires to have formula of hair lotion and fly spray.

3 parts of cholesterin; 1 part lecithin in 600 parts of absolute alcohol and mixed with 9 parts of castor oil. The mixture should be performed with 1 part of the following:—

Ylangylangbourbon oil	150 parts.
Benzyl acetate	100 "
Hydroxycitronellal	200 "
Terpineol	100 "
Cinnamyl alcohol	100 "
Rose synthetic	75 "
Coumarin	50 "
Jasmin Synthetic	50 "
Para Cresyl phenyl acetate	25 "
Para Cresyl acetate	10 "
Methyl para cresol	10 "

Fly Spray.

Naphthalene	2 lbs.
Olco-resin pyrethrene	2 oz.

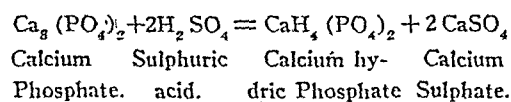
Methyl salicylate 2½ pints.
Deodorized kerosene 6¼ galls.

Dissolve the first two ingredients in the kerosene by mixing or shaking and add the methyl salicylate.

Manufacture of Phosphorous.

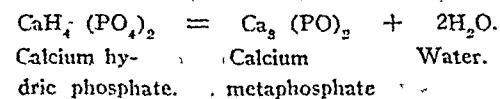
512 T. H., Taungdwingyi—Desires to know the process of manufacturing phosphorous.

The first step in the preparation of phosphorous is to mix bone ash with two-thirds of its weight of sulphuric acid diluted with water. Calcium phosphate is insoluble, but under this treatment is transformed into a soluble acid phosphate, commonly known as superphosphate of lime. The following equation represents the change which occurs:—

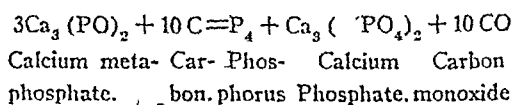


The calcium sulphate is allowed to settle, and then the clear solution of acid phosphate is evaporated down to the consistency of a syrup and mixed into a paste with powdered charcoal. This is dried and then heated to low redness in an earthenware retort, the stem of which dips under water.

The first result of the application of heat is that the acid or hydric phosphate loses its water, being converted into a salt known as the metaphosphate.—



The metaphosphate is at the high temperature decomposed by the charcoal; thus:—



The phosphorus thus produced distils over, and is purified by re-distilling and squeezing through wash-leather under warm water.

Artificial Slate.

515 G. T. A., Vyara—Wishes to learn a method of making artificial school slate.

First prepare the water-glass solution by finely crushing equal parts of solid potash and soda water-glass and pouring over this 6 times the quantity of soft river water, which is kept boiling for about 1½ hours, whereby the water-glass is completely dissolved. Next take 7 parts of slate finely ground with a little water into impalpable dust and mix with 1 part lamp black. Grind enough of this mass with the previously prepared water-glass solution as is necessary for a thick or thin coating. With this compound rough tin plates are painted uniformly and allowed to set.

Slate Pencils.

To manufacture slate pencils from slate waste, the pieces of slates are first of all reduced to fine powder, 60 parts of which are then mixed with 30 parts of powder limestone and 10 parts of silicate of soda. The mixture is kneaded into a plastic mass and forced through a perforated plate, and each pencil is deposited over a grooved slate, the overhanging ends being sawn off, when dry, by passing across a circular saw. The sharpening is done by laying the pen-

cils in a trough; the bottom one being gripped automatically in a holder which revolves at an angle, and the end is held against a rough stone revolving at high speed in water. The finished pencils are lastly packed in wooden boxes.

Picture Frame Composition.

788 V. M. C., Salem—Wishes to have a formula for preparing picture frame.

Glue	14 lbs.
Rosin	7 lbs.
Pitch	$\frac{1}{2}$ lbs.
Linseed Oil	2 $\frac{1}{2}$ pints.
Water	q.s.

Mix and boil the whole together until dissolved; then add as much whitening as will render it a hard lump.

Distilled Water.

558 S. C., Saharanpur—Wants to know the method of preparing distilled water.

Distilled water is usually prepared by distilling ordinary water with suitable precautions. For this purpose, take a tinned copper boiler furnished with a special still head and with a serpentine condenser of block tin. Pour the water into the boiler and heat to boiling. The steam issuing out of the boiler is passed through the condenser which is kept cool, whereby the steam is reconverted to water and collected in receiver. Care is necessary that the water may not boil violently, otherwise impurities will make their way along with steam. Reject the first portion of the distillate, which contains carbon dioxide and ammonium carbonate, the presence of which are recognised by the turbidity they produce in

a solution of lead acetate. If the water contains magnesium chloride, add a little lime before distillation to prevent the hydrochloric acid from distilling. In this case, also reject the first portion of the distillate because it contains ammonia from the ammoniacal salts; the remainder of the distillate is pure water. It is, however, necessary to leave the last portion of the water undistilled, because certain organic substances commence to decompose, yielding impure distilled water.

Zarda.

The underlying principle of manufacture is that the leaves are first of all stripped of their stalks and mid-ribs. These are then softened by being steeped in water or boiled in it. The leaves are then brayed and made into a paste. Sometimes a pulpy extract of the moistened leaves is drawn by straining through cloth. The paste or the extract is dried in the sun in a shallow plate and is then broken up into granules, which may be coated with gold or silver leaves or mixed with silver dust or allowed to remain plain.

Hingli Tobacco	4 ch.
Rose water	1 seer.

The stalks and ribs of the tobacco leaves are first of all rejected. The leaves are next boiled in good rose water in an earthenware vessel over a slack fire. Remove when only 4 ch. is left and strain through a clean cloth. Dry the viscous liquid in a porcelain dish in the sun to form a cake. Then break the cake into granules and mix with fine particles of silver leaves.

Syrup Colour.

The syrups as found in the market are often finely tinted after these are prepared. These may be coloured blue, red, green, yellow, etc., according to taste, but generally speaking a natural colour resembling the fruits is to be preferred. Recipes of a few colours follow:—

Blue.—Dissolve 1 oz. of finely powdered indigo in 4 oz. of sulphuric acid and add 12 oz. of water to the solution.

Red.—Take 1 part of carmine in fine powder, 4 parts of strong ammonia water. Rub up the carmine and ammonia and to the solution add distilled water, little by little, under constant trituration to make 24 parts. If on standing this shows a tendency to separate, a drop or two of ammonia will correct the trouble.

Pink.—Mix together 1 part of carmine, 6 parts of liquor potassae and 40 parts of distilled water. If the colour is too high, dilute with distilled water until the requisite colour is obtained.

Green.—Trim spinach leaves (green eatable vegetable leaves) and boil them for half a minute in water. Strain it off clear when it will be fit for use.

Boil 2 parts of liquid wash blue, 1 of powdered turmeric; add some alum to the mixture and filter it.

To obtain a fine green mix the tinctures of yellow and blue.

Yellow.—Grind saffron very fine, and then after mixing hot water to a little milk add the saffron powder. This will yield a fine yellow colour.

Purple.—Boil archil in water, and add some alum.

Orange.—A red added to any of the yellow colours gives an orange colour.

Refining Castor Oil.

The process of refining castor oil consists in treating the oil with animal

charcoal in the proportion of four to one by weight. Animal charcoal should be finely ground before it is mixed to the crude oil. The whole is put in glass or china jars and covered over with a lid and is then exposed to the rays of the sun for 15 days successively. Impurities are absorbed by the charcoal and on filtering refined oil is obtained.

Cheap Washing Soap by Cold Process.

Coconut oil	2½ mds.
Caustic soda 77°	16½ seers.
Water for soda	33½ "
Silicate of soda	25 "
Water for silicate	25 "

In the summer the coconut oil exists in the liquid state and need not be heated at all. When the oil is frozen in winter it is heated to 80° to 90°F to melt it. Take 16½ seers of water. This will make a lye of about 38°Be. Pour the lye into the melted fat or oil in a continuous stream, at the same time stir with a flat wooden stirrer about 3 in. broad. Continue gentle stirring until the lye and fat are thoroughly combined and appear of the consistence of honey. Do not stir too long, or the mixture will separate again. The time required varies somewhat with the weather and the kind of oil used; from fifteen to twenty minutes is generally sufficient. If silicate of soda is to be added, this may be done at this stage. 25 seers silicate dissolved in 25 seers of hot water may be stirred into. When the mixing is completed pour off the liquid soap into any sufficiently large square box for a mould, previously damping the sides with water so as to prevent the soap sticking. Wrap up the box well with old blankets, or better still leave it in a warm place until the next day, when the box will contain a block of soap, which can afterwards be slabbed and barred.

Blue-Black Writing Ink.

Gallic acid	1 oz.
Tannic acid	3 oz.
Gum arabic	1 dr.
Carbolic acid	1 dr.
Sulphate of iron	2 oz.
Ferric chloride solution	
10 p.c.	1 oz.
Indigotin	1½ oz.
Water	7½ pints.

Dissolve the gallic and tannic acids in 6 pints of hot water and dissolve the other ingredients in the remaining portion of the water without the application of heat. Then mix the two solutions and set aside for a fortnight and filter before bottling.

Disinfecting Fluid.

Common rosin	56 lbs.
Caustic soda lye 35°B	5 galls.
Creosote	56 lbs.
Water	65 gallons.

Melt the rosin, add the lye and stir. Continue heating with the addition of water until saponified. After this add the remaining water and stir to dissolve the soap in it. Then add the creosote and mix thoroughly. This is a very cheap disinfectant fluid.

Bleaching Fats and Oils.

The following method, which is adapted for solid and fluid fats, can be used for bleaching and clarifying oil and fats for domestic and industrial purposes. Cotton-seed oil, rape-seed oil, and all other fats and oils are prepared for treatment by mixing in a large tank with 2 to 3 per cent. of common salt and thoroughly stirring for 5 to 10 minutes with 25 to 50 per cent. of water. After a rest of 24 to 48 hours it will be found that a portion of the impurities and the water and salt have settled on the bottom. The supernatant oil is then drawn off into another tank and again thoroughly washed with cold water, and again drawn off after a rest of 6 to 12 hours.

This treatment with common salt is especially valuable for the preparation of fine table-oils, but can also be used for other oils, such as linseed oil, train oil, etc.

By conducting at the same time during the mechanical treatment an electrical current through the mixture; the oil is bleached by the decomposition of the common salt by the action of the electric current, and the formation of secondary combinations of strong bleaching power.

For many oils and fats which readily become rancid or spoiled, it is recommended to add 2 to 3 per cent. of bicarbonate of sodium to the above process. Besides the second washing with cold water, the oil can also be treated with steam conducted through it in a finely divided state, 5 to 10 minutes being sufficient for cotton-seed oil, while 15 to 20 minutes are required for rapeseed oil and 30 minutes for fish oil. By this treatment the rancid constituents are removed and the slimy particles precipitated.

Instead of steam, repeatedly heated air mixed with 20 to 30 per cent. of hot water may also be forced through the oil by means of a blowing engine. By filtering the oil thus prepared and storing it for some time, a pure product of an agreeable taste and clear pale yellow colour is obtained. For filtering, the ribbed sides and bottom of the filtering vessel are covered with endless filtering paper.

In many cases an addition of potassium permanganate; or potassium chlorate, or potassium bichromate previously dissolved in a little warm water as possible is useful. For 100 parts of oil about 1/10 part of the last-named salts and 1½ to 2 parts of common salt are used. The heated oil to be bleached is successively mixed with the salt solutions, 2 to 3 per cent. of hydrochloric acid or 1 to 1½ per cent. of sulphuric acid being added by means of a rose with constant stirring for one hour. Then add 30 per cent. of warm water to the mixture and allow it to rest.

After the oil is drawn off it is several times washed with water with an addition of some soda and finally treated with steam. The slimy sediment can be used for the manufacture of soap. This method is applicable to mineral, vegetable, and animal oils.

READER'S BUSINESS PROBLEMS

[Reader's business problems will be discussed in these pages. We invite the reader to write us his difficulties. As the department is in charge of an experienced businessman who is specially adept in dealing with such problems and to whom experiences of a large number of successful business men are available, his replies will lead the enquirer to a successful career. These replies will be published in the paper only and cannot be communicated by post.]

Starting a Poultry Farm.

U. N. M., Jubbulpur—Will you please discuss the prospect of poultry farming in our town?

Many portions of India, where the rainfall is not excessive are admirably adapted to the breeding of fowls especially so where the soil is sandy, gravelly or filled with kunkur. I think your place will be suitable for poultry farming. Imported poultry keeping and rearing is progressing yearly. There is no reason whatever why you would not be able to be successful in poultry farming as your place is favourable for starting a poultry farm but you should not depend too much upon your servants, who take no interest in the farmyard and are quite ignorant of what is necessary to its success. The greater number of stocks are killed off, not through climatic influences, but through want of care in the quality of water given to them to drink, which should be renewed, at least once or twice a day. It is most necessary that there should be sufficient room for the number of fowls kept, they cannot be entirely imprisoned and yet kept in a thriving and healthy condition. The fowl house and run must not be overcrowded, so the number of fowls to be kept will depend upon the size of the house and run. A house five feet long, five feet wide and six feet high is necessary for every five large birds. More than five birds should not be kept in this space. The floor of the fowl run must be dug up once or twice every year to a depth of a foot, and great care must be taken to keep the place quite clean or else disease will soon break out in some form or other and destroy the fowls. Charcoal and ashes are most beneficial and should be frequently scattered over the ground in the run and house.

The poultry houses should be built so as to face the most sunny aspect, so probably in all parts of India, if they were constructed as to be facing the south, they should be most advantageously built as to the comfort and prosperity of inmates.

Starting Small Business.

832 R. M. G., Dacca—Writes, "I am an old man of 66 and desire to do some independent business with a small capital say Rs. 50 to Rs. 100 so that I can get a decent return."

There are opportunities in every town to start business on a small scale. Even in town like Calcutta a man can start in a small way and build up a large trade. I know a man in Calcutta who very recently started his business career with few rupees as capital and now he is earning some hundreds per month. His business is to pack "Chanachur" in carton and sell in every nook and corner of the town through agents and salesmen. He has only organised business. There are hundreds of such commodities which can be sold at a good margin if these are packed in decent cartons and sales are organised. You can prepare scented pan masala, put in well-designed packets and sell in the market. You may also purchase ordinary vermilion from the market, perfume it and pack in artistic carton and sell in the market. I think these will be sold like hot cakes. Such business will not require large investment.

How to Fix a Price.

350 P. K. D., Delhi—Writes, "Suppose a factory can make 100 machines a week, and suppose only 20 a week are

being sold—Should the price be set on a 20 a week output?"

No it should not. One fifth of the normal volume of business cannot carry the whole of the overhead. But suppose that the sales rise to 125 a week, and suppose the factory is compelled to work overtime, what then. Should the price be set on a 125 per week output? The answers—"No, it should not." The price then would be lower than it needs to be. And the firm should be lower than it needs to be. And the firm would be giving away a part of its rightful profits. In my opinion the price should be set on an 80-machines a week output. If the sales fall below 80 per week, then the margin of net profit is lower than it ought to be; and when the sales go above 80 per week, there is a nice amount of extra profit. No firm should give away the extra profit that it makes by good salesmanship.

Advantages and Disadvantages of Hire Purchase System.

525 H. K. D., Burdwan—Wants to know the advantages and disadvantages of business on hire purchase system.

Business on the hire purchase system has both its advantages and disadvantages. Payments by easy instalments helps customers to make purchases which they would otherwise defer till the accumulation of sufficient funds in their hands. But again the system is open to the charge that it brings in customers who have not the means to make regular payment and that it piles up bad debts. If hire purchase business is done care should be exercised to do the business systematically so that the interests of the sellers do not suffer. The advantages of the system are manifold and although an excessive indulgence in it may cripple a man the same remark applies to life insurance the soundness of which no one will be found to question.

Assignment of Life Assurance Policy.

713 P. C. R., Allahabad—Desires to know the procedure of the assignment of policy.

A life assurance policy is always assignable for valuable consideration, that is for money, friendship, love for blood relationship or marriage or for any other benefit from the assignee. The assignment is to be in writing and a notice of such assignment is to be given to the company for registration, with a fix fee for it. If the assignment is made by an endorsement to that effect on the policy itself, then no separate stamp on it is necessary, but in case it is made by a separate document proper stamp is to be affixed to it. An assignment may be absolute that is irrevocable, or conditional that is revocable on the fulfilment of the condition attached to it; for instance, when a policy is mortgaged, the assignment is revoked on payment of the money for which the assignment was made in favour of the mortgage. A life assurance policy forms part of the estate of the assured or his assignee like the other properties and is treated like them after his or her death. When an assignment is made for natural love and affection, the assignment can be set aside by a creditor of the assured through a law court; if he (the assured) is adjudicated a bankrupt within two years from the date of such assignment.

Writing an Advertisement.

850 H. K. S, Nagpur—Desires to be enlightened on how to write a good advertisement.

In writing an advertisement be cautious, in displaying be bold. The advertisements writer's most valuable asset is faith in the thing he advertises. Good display saves a bad advertisement and the worst compositor alive cannot wholly kill a good one. Don't under-estimate the subtle power of suggestion. It is at time more effective than persuasion. Don't be too original. The man who differs radically from his fellow men is occasionally a genius but usually he is a freak. Study words; to the writer, they are what colours are to the painter. Don't use a chrome yellow word if a lemon yellow word will express more exactly the idea you wish to convey.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of Industry are invited. Enquiries or replies from our experts will be published free of charge. Questions are replied by post on receipt of As. 4 stamps of small value only for each question. In order to facilitate the work of Editor's Department and to help prompt action the readers are requested to send enquiries in separate letters.]

249 R. M. P., Dharmaj—Process of testing diamonds will appear in an early issue of Industry.

250 D. R. S., Mirpur—You better diminish the proportion of water and increase the proportion of gelatine.

252 U. P., Nagpur City—Coal tar distillate may be had of B. K. Paul & Co., Ltd., 1-3, Bonfields Lane, Calcutta and Bengal Chemical & Pharmaceutical Works Ltd, 31, Chittaranjan Avenue, Calcutta.

254 S. M., Calcutta—You perhaps want collapsible tubes for keeping paste. Collapsible tubes may be had of Shah & Co., 55, Ezra Street, Calcutta.

255 R. K. K., Srinagar—(1) Tea may be had of A. Assana Marikar, Kandy, Ceylon; M. C. A. Samad & Co, Kandy, Ceylon; Alliance Tea Co., 8C, Lall Bazar Street, Calcutta; Bhattacharjee & Co., 57, Cornwallis Street, Calcutta and India Tea Co., Ltd, 103, Clive Street, Calcutta.

256 G. C. J. C., Jagadhri—For gramophones write to S. Das & Sons, 11, Lower Chitpur Road; M. L. Shaw Ltd., 5, Dharamtala Street and K. C. Dey & Sons, 96, Lower Chitpore Road; all of Calcutta.

258 S. J. C., Peddapuram—(1) Toys may be supplied by Kyodo Shokwal Ltd., 21, Andojibashidori 1-Chome, Minamiku, Osaka, Japan, Japanese Bead Co., 24, Doshomachi 5-Chome, Higashi-ku, Osaka, Japan and Araki Kinsuke & Co., 26, Minami Kynhojmachu 1-Chome, Higashi-ku, Osaka, Japan. (2) Fancy goods may be supplied by Hishibara & Co., Ltd, Utsubo Kitadori 1-Chome, Nishi-ku, Osaka, Japan and Naniwa Boyeki Shokai, 25 Satsumabori Minaminocho Nisu-ku, Osaka, Japan. (3) Calendars may be

supplied by Kojima Insatsusho, 61, Uraye Naka 1-Chome, Nishiyodogawe-ku, Osaka, Japan; Braner F. Oscar, Buchholz (Sachs) Germany; C. A. Flechsing, Zittan (Saxony) Germany; American Art Works, Coshocton, Ohio, U.S.A. and Gibson Art Co., Cincinnati, Ohio, U.S.A. Advertising novelties may also be supplied by the above firms.

727 S. N. C., Mangalgarh—(1) Sugar coating is rather a complicated process. Dr. Symes recommends the following as the most practical method:—Pills well dried on the surface are placed in a tinned copper bowl with a flat bottom, or an enamelled iron dish, the surface of which has been moistened with syrup or syrup and gum. They are then rotated and gently heated very finely powdered sugar being dusted on, and the motion kept up till a perfectly dry, hard and whitish coating is obtained the operation being repeated if necessary. (2) Process of refining coconut oil will be found in January 1935 issue of Industry.

731 J. D. S., Ambala Cantt—(1) Process of manufacturing boot polish will be found in December 1934 issue of Industry. (2) For petrol pumps write to Baldwin Locomotive Works, 5, Dalhousie Square, Calcutta and Davenport & Co. Ltd., 6, Church Lane, Calcutta.

732 B. S. R., Ghazipur—(1) Hindi equivalents of the seeds and herbs you require are not known. (2) Liquid phenol is carbolic acid in liquid form. (3) Following is a formula of blue-black ink powder: Tannin 1 oz.; calcined sulphate of iron $3\frac{1}{2}$ oz.; gum arabic 75 grains; aniline blue (water soluble) 2 grains; refined sugar 2 dr. Mix altogether all the ingredients in perfectly dry state and keep in paper packets.

Machinery for the Manufacture of

Chemicals, Powder, Hair Oils, Creams, Perfumes, Pills, Tablets, Drugs, Medicines,
Artificial Ghee, etc. Also:—

Chemical Plant, Oil Mills, Filter Presses, Sugar Mills & Centrifugals, Tin Box Making Machinery, Sterilisers, Laboratory Apparatus, Biscuit and Bread Making Machinery, Laundry Machinery, Tube-filling Machinery, Winnowing Machinery, Threshing Machinery, Fruit Preserving Machinery, Water Softening Plant, Slate and Stone Working Machinery and Pumps for all purposes

W. J. ALCOCK & CO., 7, Hastings Street, Calcutta. Saroup & Bansilal, 57, The Mall, Lahore. Agent for Bareilly District KODESIA ENGINEERING CO., Naiini Tal Road, Bareilly.

A fluid ink can be produced promptly by putting one of these packets into a cupful of boiling water. (4) Lemon squash is a good drink. Nose drops, corn cure, and antacid powder are medicines. Other things are used as toilet articles. (5) Hydrus wool fat may be had of B. K. Paul & Co., 1 & 3, Bonfields Lane, Calcutta.

734 K. V. C., Agra—(1) You may consult The Manufacture of Rubber Goods by A. Heil and Dr W. Esch. (2) You may refer your query to the Consul-General for Japan, 26-27, Dalhousie Square, Calcutta.

736 M. L., Rangoon—(1) You may consult British Pharmacopeia to be had of Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta. (2) You may consult Medical Directory published by B. K. Paul & Co., Ltd., 1 & 3, Bonfields Lane, Calcutta.

737 M. O. S., Mandalay—(1) For selling Burmese products you may advertise in newspapers and periodicals. (2) Fidelity bond is issued by Insurance and Guarantee Companies whereby in consideration of the premium, they guarantee the fidelity of persons holding positions of trust, and undertake to make good any loss occasioned by defalcation.

738 M. S., Deolali—(1) German Exporter is published by German Exporter, Berlin-Charlottenburg 2, Germany. (2) Address of All-India Weaving Institute is not known.

741 S. P. D., Nagpur—Milk and milk products are used as food.

742 N. S., Hingoli—(7) Secondhand books may be had of The Book Exchange, 213, Cornwallis Street, Calcutta. (2) Optical goods may be had of London Optical Co., 306, Bowbazar Street and Optics Manufacturing Co., 300-303, Bowbazar Street; both of Calcutta. (3) Ready made blocks may be had of C. H. Aran & Co., 235/1, Bowbazar Street; Bengal Art Union, 84/3A, Bowbazar Street and National Halftone Co., 220, Cornwallis Street; all of Calcutta. (4) Wants to be put in touch with the suppliers of all kinds of combs of wood, ivory, horn, etc. (5) For machines required for wire product making write to Francis Klein, 1, Royal Exchange Place, Calcutta (6) You perhaps require services of forwarding agents. Following is a list of forwarding agents:—Binny

& Co. Ltd., Armenian St. Madras; Govindji R. Mehta, 1-94, China Bazar Road, Madras; Madura Co. Ltd., Madura; Grindlay & Co., Nicol Road, Ballard Estate, Bombay. (7) Refer to P. K. Ghosh, M.A., B.L., 12/1 A, Nayan Chand Dutt Street, Calcutta for Railway and Bank claims. (8) For Durbv and other lottery tickets write to Royal Calcutta Turf Club, No. 11, Russel Street and Rangers Club, No. 5, Dalhousie Square; both of Calcutta.

743 M. S. S., Mangurda—Japanese goods may be had of Indo-Japanese Commercial Museum, 135, Canning Street, Calcutta; Mitsui-bussan Kaisa, 100, Clive Street, Calcutta.

744 A. G. C., Bombay—Collapsible tubes for tooth paste may be supplied by Messrs Shah & Co., 55, Ezra Street; Sikri Bottle Stores, 9, Ezra Street; both of Calcutta.

748 B. N., Jammu Tawi—Regarding training in soap making you may refer to Mr. R. Ghose, Soap expert, 8, Kripanath Lane, Calcutta and also to Soap Training House, Saidpur, E. B. Rly.

749 D. & S., Gohana—(1) The process of making liquid disinfectant which is commonly called phenyle has been fully described in Antiseptics and Disinfectants published from this office. You are advised to go through the book carefully. (2) Rape-seed oil being a vegetable oil can be converted into soap, see its properties in your book. (3) The maximum amount of salt that can be used should be determined by the strength of causticity of the soap. If it is greater salt can be used smaller (5 to 10%); if smaller, salt in larger proportion upto 15% can be used. (4) The sample of soap may be sent as desired and we shall try to supply a formula accordingly free of cost. You may better consult Mr. R. Ghose (Soap Expert), 8, Kripanath Lane, Calcutta.

750 K. K. A., Kamrup—(1) Unsized porous paper is blotting paper which may be had of all paper merchants such as Bholanath Dutt & Sons, 167, Old China Bazar Street, Calcutta. (2) Recipes of damp-proof safety matches follow:—Head composition—Potash chlorate 28, glass powder 5, sulphur 2½, potash bichromate 1, manganese dioxide 6, rosin powder 2, infusorial earth 2, glue 4, water for glue 16; all in parts. Surface composition—Red phos-

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Branches: 153/1, RADHABAZAR STREET, CALCUTTA. 3, CHUNANI LANE, BOMBAY, 7.



phorus 10, antimony trisulphide 5, glass powder $\frac{1}{2}$, pot. Bichromate $\frac{1}{4}$; glue 24, water for glue 16. For detailed process consult January and February 1932 issues of Industry. (3) License for match factory has to be taken from commissioner of excise of the province where the factory is to be started.

752 M. P. T., Mylapore—Almata is a patent food. The names and addresses of its dealers are not known. You may enquire of B. K. Paul & Co Ltd., 1 & 3, Bonfields Lane, Calcutta.

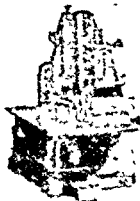
755 C. I. & T. C., Cochun—(1) The following are wholesale coconut oil dealers in Calcutta: Khimjee Hansraj, 165, Lower Chitpur Road, Adam Hajee Peer Md. Essack 1 Amratola Lane; Hajee Habib Hajee Pirmahomed, 25, Amratola Street; Hajee Ebrahim Cassim, 12, Amratola Lane; Hajee Mahommed Jaffar, 142, Lower Chitpore Road; Haji Tar Mohammed Haji Tayood & Co., 12, Amratola Lane; Hajee Jamal Noor Mahomed, 5, Amratola Lane; Hoosen Kasam Dada. (2) The present market rate is Rs 12 per md. ex-godown ghat delivery. It is exported to foreign countries. England, France, Germany, Japan, America and all soap producing countries import it largely. Coconut oil is used in making soap and glycerine, vegetable butter hair oils etc.

758 B. G. N., Nagpur—(1) The colour of til oil may be removed by refining the same with potassium bichromate and sulphuric acid. Add gradually to the warm oil 1% potassium bichromate and 1% strong sulphuric acid diluted with equal quantity of water stirring constantly for $\frac{1}{2}$ to 1 hour; then let it settle for a day; run off the acid liquor and boil the oil with 60% water skimming off the surface substances. Set aside for another 24 hours and take off the clear oil from above. (2) Formula of almond hulwa appeared in April 1934 issue of Industry. (3) Ammonia may be prepared from any of the ammoniacal salts by heating with a stronger base as lime or soda. Of these lime is preferred on account of cheapness (vide Inorganic Chemistry by Jago). (4) 100 candle power

of a gas mantle means the mantle is fit for a lamp that gives a light as powerful as 100 candles would give together. So also is 400 candle power. (5) The mantle or the net becomes weaker by the action of the impregnating solution. (8) Process of making felt cap appeared in May 1935 issue of Industry. (11) For dyeing silk thread you may read Dyeing Silk, Mixed Silk Fabrics and Artificial Silks; by Dr. A. Ganswindt, translated by C. Salter, to be had of W. & G. Foyle Ltd, Charing Cross Road, London W.C.2. (12) The deposit is the undissolved precipitate due to defective saponification. (13) To make liquid rosin soap take 5 srs. of rosin (preferably 4 seers of rosin and 1 seer of castor oil) boil with caustic potash 1 seer made into solution with 4 seers of water on a water bath. The boiling should be carried on for a long time about 5 hours occasionally adding water if necessary. After the rosin is completely saponified add water from 6 to 8 seers and mix. (14) Go through Manual of Dyeing, 2 Vols. by E. Knecht, C. Rawson and Locwenenthal to be had of the above named bookseller. (16) Consult "Disinfectants & Antiseptics" published from this office. (19) The measurement should correspond the required size and shape of the mantle. (20) Only a few drops of hydrofluoric acid should be added to the alcohol for denitrating silk. (21) Nitrocellulose is gun cotton; collodion 4% is collodion diluted with 4% ether. Nos. 3, 6, 10, 17 and 18 will appear in formula and No. 15 in T. E. in an early issue of Industry.

759 A. I. W., Agra—Wire netting manufacturer:—Kedarnath Mfg. Works, 94, Baradeo, Benares City. No other address except one mentioned in your letter is available

760 S. B., Bikaner—(1) Make a decoction of Brahmi herb and boil it with white granular sugar and equal quantity of water to make it a syrup (2) Make a simple syrup by boiling 1 seer of white granular sugar with 1 seer of water and skimming the floating impurities:



Union Special High Speed Overlock Machine for Hosiery Trade.

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SEWING MACHINE FOR HOSIERY, LEATHER, CANVAS AND JUTE, ETC

High Speed Latest Models for Overlocking and Hemming, Double and single chain stitch; ornamental necking; 4 needle button plate joining, etc., etc.

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strain through a fine cloth, and add to it 3 dr. geranium oil and 1 dr. sandal oil. (3) Take the advice of an Ayurvedic Physician. (4) Gelatin may be had of Messrs B. K. Paul & Co., Ltd., 1 & 3, Bonfields Lane, Calcutta. Ordinary commercial glycerine will do. (5) Cantharidin is the active principle of cantharidis (Spanish fly). It is in colourless glistening crystal, inodorous, soluble in chloroform, acetone and fixed oils. Oil cantharidis is an oily preparation of cantharidin. Hence, both are all right, only varying in strength. (6) Mix the sandal wood dust and the chalk with 20 oz. of spirit of wine. Yes, the amount of spirit was omitted through oversight. (7) Commercial artists: National Halftone & Co., 220, Cornwallis Street, Calcutta; Das Bros., 87, Durga Charan Mitter Street, Calcutta; R. H. Pickard Chas, 9A, Kirkgate, Leeds, England.

761 C. P. K. N., Vaduvur—Pioneer Mail Supply Co., Calcutta is not known to us. Washing apparatus may be supplied by The Progress Engineering Co., 139, Meadows Street, Corner, Forbes Street, Fort, Bombay; W. Leslie & Co., 19, Chowringhee Road, Calcutta.

762 D. E. W., Sikandrabad—For casting of iron you may consult the following books:—The Modern Iron-foundry price 15s. and Pattern Making Price 18s. both by J. G. Horner; Practical Iron-founding by J. Horner, price 10s.; The Founders' Manual by D. W. Payne, price 24s. All may be had of W. and G. Foyle, Ltd., Charing Cross Road, London W.C.2

763 S. B., Jaipur City—(1) Manufacturers of drawing apparatus and instruments of Japan—Nakanishi Kunitaro Shoten, 75, Komatsubaracho, Kitaku, Osaka. Tamaya Osaka, Branch, 7, Fushimimachi 4-Chome, Higashiku, Osaka. Drawing paper.—Marudai Paper Co., 30, Minami Kyutaromachi 1-Chome, Higashiku, Osaka. Drawing pins.—Asai Shoten, 28, Itachibori Minamidori, 2-Chome, Nishiku, Osaka For manufacturers directory of Japan buy

Osaka Trade Index price 6 yen published by The Osaka Commercial Museum, Osaka, Japan.

764 B. M. S., Broach—(1) The field of medical profession though already overcrowded is less so than legal and clerical lines. In order to become a sound physician one must have college training. Homeopathy is not so popular and effective a treatment as allopathy. As regards subjects to be studied you should consult physicians or see the syllabus of Medical Colleges. These are outside the scope of Industry and we cannot advise you further, (2) Regarding cinematography the following books are recommended: The Complete Projectionist, by R. H. Cricks price 5s. Modern Picture Theatre Electrical Equipment and Projection by R. V. Johnson price 10s. 6d. Recording Sound for Motion Pictures Edited by L. Cown price 30s. Kinematograph Studio Technique price 2s. 6d. Projecting Sound Pictures by A. Nadell price 15s. Cine-Photography for Amateurs by J. H. Reyner price 10s. 6d. All books may be had of W. & G. Foyle, Charing Cross Road, London W.C.2. For apprenticeship or employment write to film producing companies or cinema companies as the case may be. (3) For clock and watch repairing consult the following books:—Clock Repairing and Making, price 5s. and Watch Repairing, Cleaning and Adjusting price 5s. both by F. J. Garrard to be had of W. & G. Foyle Ltd. About the book on repairing camera please write to the above publishers. (4) Formulas of Paris gold or imitation gold appeared in December 1934 issue of Industry.

765 S. A. H., Sehore—(1) "All rights reserved" is copy right which means the sole right to produce or reproduce the work or any substantial part thereof in any material form whatsoever, and in any language to perform, or in the case of a lecture, to deliver, the work or any substantial part thereof in public. Hence, translation of a book into another language without author's permission is an infringement of that right. (2) Fruit dealers: Haji A. N.

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BATLIBOI & CO., Engineers, Forbes St., Fort. Bombay.

Hussain Rasul & Co, Godown 3, Crawford Market; Harak Chand Shivjee, Kharek Bazar, Mandvi; both of Bombay; Md. Ibrahim & Bros, Chandni Chowk, Delhi; M. Abdul Rahman, Jagadhri, Lahore.

768 K. S. M., Ottapalam—The following composition may be used for envelope gum: Dextrose 2 parts, acetic acid 1 part, water 3 parts, alcohol 1 part.

772 J. M. D., Siliguri—(1) Orange juice is now-a-days extracted by a sort of machine and the juice is preserved longer by the process of sterilisation. You are advised to go through the detailed process of extracting fruit juices and their preservation described in Manufacture of Syrup published from this office. The extracting machine may be had of Oriental Machinery Supplying Agency, 20, Lall Bazar Street, Calcutta. (2) For selling those articles employ agents and advertise in papers.

773 D & C., Bombay—The following are electric carbon brush manufacturers: Calcutta Carbon Brush Mfg. Co., 21, Parsee Church Street, Calcutta, S. Boseck & Co., Nanda Mullick Lane, Calcutta.

774 V. S. B. S., Damoh—Some more addresses of tin can manufacturers are given here please try therein.—Habib Dada & Co., 63, Dontad St., Mandvi, Bombay; Central Canning Co., Karwar, Kanara. If you send postage stamp for reply you are surely to get a reply at least.

777 A. C. B., Kohat—"Ice fruit" is a sort of "Kulpi Baraf" or ice cream which contains fruit juice in lieu of milk.

781 S. B., Cawnpore—(1) The formula of refining salt will appear in an early issue of Industry. (2) Please advertise in leading journals. (3) The whereabouts of Ghose's nib is not known. (4) For small iron machine for extracting almond oil you may write to Messrs Balmer Lawrie & Co, 103, Clive Street, Calcutta.

782 S. A., Ghat Kopar—The dark colour of your prepared Antipilogestine is probably due to the vessel used. Please prepare the same in an enamelled or porcelain vessel and use kaolin of the best stuff.

786 D. C. Mangalore—The following is a formula of coffee tablet:—Dilute 20 lbs. of fresh cow's milk with 6 lbs. of water. Infuse the mixture with 24 oz. of any good coffee. Boil gently over a mild fire for a few minutes and then strain. Add to the filtrate liquid 6 lbs. of refined sugar and thicken it by boiling down. Stir continually until it is pasty and then pour into a buttered mould of tin. Allow to cool and solidify and then cut into pieces of desired size weight. They should be immediately canned into tin pots without touching by hands. To use these tablets dissolve a cube in a cup of hot water and drink. (2) There is no glucose in the formula. Glucose may be had of B. K. Paul & Co., 1 & 3, Bonfields Lane, Calcutta. (3) Tin can manufacture is a purely mechanical subject, the machinery of which may be supplied by Messrs L. Schuler A. G. Goppingen, Germany. When you buy the machinery you will be furnished with necessary instruction about manipulation of the machinery by them. The address of Consul General for Japan in India is 26-27, Dalhousie Square, Calcutta; that of Consul General for France is Cuffe Parade, Colaba, Bombay.

787 M. V. V., Belgaum—(1) Umbrella cloth and fittings may be had of Messrs Bird & Co., Chartered Bank Bldg., Clive Street, Calcutta. The fitting is a purely mechanical subject and may be learned from an umbrella mechanic. The said company may also send such a mechanic to you for demonstration if required by you. (2) Umbrella handles, fittings and accessories may be had of K. Kitagawa & Co., 7, Kita Kayutaromachi, 4 Chome, Higashiku, Osaka, Japan; and Tomikawa & Co., 21, Andojibashidori 2-Chome, Minamiku, Osaka, Japan. (3) Umbrella fitting tools may be had of Oriental Machinery Supplying Agency, 20, Lall Bazar Street, Calcutta.

790 K. R. N., Parlakimedi—Messrs Mabie Todd & Co. Ltd. Swan House, 133-135, Oxford Street, London W1, are the manufacturers of Swan fountain pen. Please write to them for the address of their Indian sole agent. (2) "Venesta furniture may be had of Williams



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6/1, Akrur Dutt Lane, Calcutta.

Magor & Co., 4, Mangoe Lane, Calcutta. Swan fountain pens may be had of all respectable firms dealing in fountain pens such as Dhar Bros., 82, Harrison Road, Calcutta.

794 M. M. H. K., Shahjehanpur—Selling hot and cold drinks such as hot tea, sherbet may yield a good profit with small capital and is fit for being undertaken by gentleman classes. You may therefore open restaurants. Book selling and drapery are also good for gentlemen.

796 P. M. S. A., Barbados—Formula you require will appear in an early issue of Industry.

797 T. N., Kokuvil—(1 & 2) Queries from any source are replied through the medium of Industry in due course. Only those accompanied by 4 as. postage stamps for each query are replied by post. (3) Pyorrhoea cure tooth powder.—Prepared chalk 6 oz., powdered charcoal 2 oz., powdered catechu 1 oz., soap powder $\frac{1}{2}$ oz., menthol 10 gr., thymol 5 gr., carbolic acid 1 gr., oil of winter-green 10 m. Mix well. (4) Pain Balm: Methyl salicylate 5 oz.; menthol 1 oz.; eucalyptol 1 oz.; cajuput oil 1 oz.; wool fat 10 oz.; Paraffin 22 oz. Mix well. (5) The name of an old subscriber of Jaffna follows:—Mr. M. I. Ignatins, 2 Petrol Pump Service, Chemmu St., Jaffna. (6 & 7) Tobacco for cheap cigarettes may be supplied by A. Abdul Karim & Co., Mannady St., G. T. Madras; N. A. M. Sultan & Co., Station View, Negapatam, Tanjore. Virginia cut tobacco for cigarettes may be supplied by Indian Leaf Tobacco Development Co., Khajuali, Darbhanga, Chirala, Guntur. (8) Manila paper may be supplied by British India Paper Co., Anderson St., Madras; Wilson & Co., Jehangir St., G. T. Madras. (9) Yes, lozenge balls require no machinery. Punching machine is required for sized lozenges and chocolates. (10) Chocolate making appeared in September 1932 issue of Industry. (11) Add to the formula of painbalm above, liquid extract of Hammamelis 3 oz. and strong solution of lead sub acetate 3 oz. This will give an ointment resembling "Zambuk." (12) See above

Manila paper dealers who can supply cigarette papers too. (13) Read Manufacture of Soap published from this office. You may also refer to R. Ghose, Soap Expert, 8, Kripanath Lane, Calcutta with postage stamp for reply.

798 H. M., Kutiya—Without seeing the soap and knowing the formula applied by you we cannot say anything about the defect of the soap prepared. You may however refer to R. Ghose, Soap Expert 8, Kripanath Lane, Calcutta with postage stamp for reply.

799 K. S. S., Mungonda—(1) Addresses of coconut oil merchants have been given under No. 755. (2) Oil cake dealers:—Mathuradas Haridas, 34, 2nd, Panjrapole Lane, Bombay; Julu Ram Govind Ram Jogbani, Purnea. (3) For methods of deodorising coconut oil see January and March 1935 issues of Industry. (4) The method of testing groundnut oil (Gingeli oil) will appear in an early issue of Industry.

801 P. S. V. P.; Farrukhabad,—(1) The following formula of hair oil will satisfy nearly all the conditions. Grey hair cannot be blackened without hair dye: Olive oil 16 oz.; Sandal oil $\frac{1}{2}$ oz.; Bergamot oil $\frac{1}{2}$ oz.; oil Cantharides 2 dr; Cocoa Butter 1 oz.; oil Rosemary $\frac{1}{2}$ oz.; Balsam Peru 1 oz. Add the ingredients to the Olive oil one after another with constant stirring. Then filter through filter paper and bottle. (2) A good recipe of snow appeared in June '34 issue of Industry. (3) Formula of hair dye appeared in May '34 issue of Industry. (4) Sprinkle the hair dye on the hair and brush with a soft brush. (5) Apply with a brush as directed. Don't use palm of the hand. (6) The solution here means a solution containing 3 parts of hydrogen peroxide and 97 parts of water. Hydrogen peroxide may be used by the palm or by a brush. By parts means by the same weight. Thus if you take the 1st ingredient 10 oz. the 2nd should be taken 3 oz. and not 3 gr. or 3 lbs. Alcohol cannot be substituted for anything else. (7) No reliable institute is yet known where film photography etc., may be learned. (8) See Hair Restorer I page 506 November '34 issue of Industry. Add to it Cantharidine 1 gr. acetic ether 6 dr. Ratio means the relation or proportion of one thing to another. (9) A good formula of pain balm appeared in September '34 issue of Industry. (10) The following magazines may be recommended:—Commercial Gazette, 2, Royal Exchange Place, Calcutta, Indian Trade Journal, Civil Lines, Delhi; Commerce, Royal Insurance Bldgs, Churchgate St. Post Box No. 840, Bombay; Indian Journal of Medicine, 82-3, Cornwallis St, Calcutta; Indian Journal of Medical Research, 3, Esplanade East, Calcutta. (11) See (8) above, Subscribers are

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Officer, Mangalore, 3rd Dec. 1934.

Sole Agents: **THE PUROID PRODUCTS Ltd.,**
Post Box 2092, Bombay.

not allowed any concession in the price of books.

802 T. S. S., Badagara,—(1) No other detailed process of making incense stick is available. The ingredients when ground and mixed well will form a paste which has to be applied to sticks and rolled by the hand or in any convenient manner into proper shape. (2) "Indian Perfumes Essences and Hair Oils" deals with the hair oils as desired. Try No. V p. 155.

805 H. M. K., Srinagar,—Please abide by the instructions of a good surgeon. This is outside the scope of Industry. It is not possible for us to advise you on the matter.

808 S. S. & C., Guntur,—The following are tobacco importers of Japan; you may negotiate with them direct:—International Commercial Co. Ltd., Uchi Awajimachi, 2, Chome, Higashiku, Osaka; Goshii Kaisha, Kongo, Shokwai, 13, Edo-ori Minamidori, 2, Chome, Nishiku, Osaka, Yamanaka & Co, Koraibashi, 1, Chome Higashiku, Osaka.

810 B. H. N., Nepal,—(1) There are many subscribers of Industry in Nepal of whom two addresses are given below—Harka Bahadur & Khadga Bahadur, Blumsenthan, Katmandu, Joti Raj Ananda Raj, Patun, Sahal Tole, Nepal (2) Soorki grinding machine may be had of Marshall Sons & Co, Ltd, 99, Clive St., Calcutta Cardboard and paper making machine may be had of Escher Wyss & Co, Japan Engineering Office, 320/22, Marunouchi Bldg., Kajimachiku, Tokio, Japan; Nishiyama Iron Works 12, Asahibashi-dori, 1, Chome, Kono-hana-ku, Osaka, Japan In order to secure service advertise in leading papers.

812 V. M. & Co, Bombay,—The addresses of richmen and Maharajas of India will be found in Thackers Directory published by Thackers Press Ltd, 6, Mangoe Lane, Calcutta.

814 V. B., Negapatam,—(1) Enquire of Anglo-Swiss Watch Co, 6 & 7, Dalhousie Square, Calcutta. (2) Metallurgical apparatus may be supplied by W. J. Alcock & Co, 7, Hastings St., Calcutta (3 & 4) Will appear in formula in an early issue of Industry. (5) The 9th edition of World-Wide English Correspondence is already out.

815 S. A.,—Ghat Kopar,—(1) Dissolve Chrysophanic acid 1 dr. in 24 dr. of alcohol. It will give a good ringworm lotion. (2) Gripe water:—Pot, Bicarb 1 dr., Simple Syrup 2 oz., Aqua Carui 2 oz., Aqua Anethu 8 oz., mix. Will appear in an early issue of Industry. (4) Linseed oil is not used in antiphlogestine. (5) Fermentation is decomposition producing alcohol. (6) No. (7) Lime water is prepared by 1/10 gr. of slaked lime mixed with 110 minims of water well shaken (8) Consult a physician.

(9) What kind of opinion do you want please? The book is elaborate and useful to chemists but to laymen difficult to understand fully. (10) Can't say anything about the reputation of a firm. (11) No.

817 P. S. R., Veerarajendrapet,—Singer Sewing Machine Co, 230, Hornby Rd., Bombay, or the company whose machine you have got may supply you the embroidery apparatus

818 S. R. I., Amarpet,—Please refer to J. F. Madan, 5, Dharamtala Street, Calcutta

820 N. R. K., Ooregum Mine—Ice cream making machine may be supplied by Universal Mutual Benefit Co, 1009, Panch Kuin Road, New Delhi.

821 S. N. G. D., Ichapur,—(1) Books on magic may be had of D. B Taraporevala Sons & Co, Hornby Road, Bombay. (2) Magical apparatus may be supplied by K. R. Lingham, Mystic Home, Vizianagram City; A. W. Gomage Ltd, Holborn, London; Michigan Magic Shop, 4233 Hamilton Avenue, Chicago, Illinois (3) Mr. Ganapati, Mr. Raja Bose are the famous magicians of Calcutta. Mr. Hiranyaksha Mitra, 141, Cornwallis Street, Calcutta is a meritorious young magician though not yet widely known He can render you valuable practical help if amply remunerated. (4) Magic is taught in the following institutes—The Bhanna Magical Academy, 65, Krishna Rao Tank Square W B., Madura; The Magic Circle Anderson's Hotel, Fleet St., London E. C. 4; The Magician's Club, 14, Green St, 14, Green Leicester Square, London W. C. 2. and The Society of American Magicians, 493, Sixth Ave, New York City, America.

822 B. V. N., Bellary—Yarn for balls and reels may be supplied by Omersee Kesowjee & Co, Camp Bazar, Cannanore, Malabar Coast; P. K. D. R. Swamy & Co, Rannad Road,

S. H. Kelkar & Co.



36, Mangaldas Road,
Bombay No. 2.
Wholesale Importers and
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Chemicals, Synthetic Per-
fumes, Flower Ottos, Soap
Perfumes, Oil colours and
all sorts of Perfumery Raw
Materials required for Per-
fumes Soap Makers, Agar-
bathi Manufacturers, etc,
etc.

Prices and other Particulars
on Application.

Madura; S. S. Ramudaiye & Bros., Ramnad Road, Madura, C. R. Appu Iyer & Sons, Big Bazar, Palghat, Malabar

823 R. M. R.,—Metugada—(1) Marble tiles may be supplied by C. Bhogalal & Co., Hanuman Bldg., Elphinstone Circle, Fort, Bombay; F. Muragha & Co., 12, Green Street, Fort, Bombay; Garlick & Co., Jacob's Circle, Bombay, Dhanjshaw Ratanji Medhora, Bilimora, Surat; Art Marbles Stone & Mosaic Co., Ltd., 12, Broadway, London S. W. 1; Art Pavements and Decorations Ltd., Trafford Park, Manchester, The Marble Mosaic Co. Ltd., Wade Street, St. Judes, Bristol. (2) Clay merchants:—Fayle B. & Co. Ltd., Corfe Castle Dorset; Hexter & Budge, East Park, Newton Abbot; Knight E. E. 19, Albion St., Hanley, all of England. (3) Marble cutting and polishing tools may be supplied by Bertrams Ltd., St. Katherine's Works, Sciennes, Edinburgh; Cohen George Sons & Co. Ltd., Park Royal Road, North Acton, London N. W. 10; Industrial Engineering Co., Pydhoni, Bombay 3.

824 N. K. R., Bijapur—(1) An exhaustive article on electroplating of metals appeared in June 1932 issue of Industry. Implements required are battery, dynamo current depositor, etc. (2) Formula of nickelplating appeared in February 1935 issue of Industry. An elaborate article on chromium plating appeared in May 1934 issue of Industry. (3) Tin cans may be supplied by Central Canning Co., Karwar, Kanara. Vacuum pump may be supplied by Oriental Machinery Supplying Agency Ltd., 20, Lal Bazar St.; W. J. Alcock & Co., 7, Hastings Street, both of Calcutta.

830 C. A. J., Travancore—Mature but not ripe bananas are made into flour. First peel the bananas, then cut them into slices, dry, and powder by the help of a grinding machine. Pass through a fine sieve and pack.

835 A. N., Monghyr—(1) It is not possible to recharge a dry cell once exhausted. The following methods may however be adopted. The cell may be partially restored if connected to a suitable electric circuit for 3 or 4 hours

similar to the manner in which accumulators are charged. Another method is to remove the paper covering and pierce the zinc sheet with holes. Keep the whole in a solution of ammon chloride. Then cover up again with paper as before. (2) Refining coconut oil:—Take 10 srs. of coconut oil and 5 seers of water in an iron or earthen vessel or in a canister tin. Warm the oil and mix with it $\frac{1}{2}$ to 1 ch. caustic soda solution 33°B. The oil will become milky white, add $\frac{1}{2}$ to 1 seer salt and boil. Skim off the dirty foam by a perforated ladle. When the foam appears no more dirty take the vessel away from fire and allow the oil to settle for about 12 hours

836 R. P., Amritsar—The formula you require will appear in an early issue of Industry.

837 S. B. M., Kashmir—(1) Addresses of jewellers who manufacture:—Lindsay and Paisley Ltd., 3, Gordon Street, Glasgow; Phillips, 57, Lime St., Liverpool; Anton Puschel, Gahlonza N., C. S. R., Lactenstrasse 5, Germany; B. Sarkar & Sons, Guinea House, 131, Bowbazar Street, Calcutta; M. B. Sarkar & Sons, 124, 124/1, Bowbazar Street, Calcutta; Ghosh & Sons, 16/1, Radha Bazar Street, Calcutta. (2) Precious stone dealers:—Fulchand Kasturchand, 398, Khara Kuva, Shaikh Memon St., Bombay (Pearl); Raichand Motichand & Co., 49-59, Mumbadevi Road, Zaveri Bazar, Bombay; Gebr. Herringer, Idar-Oberstein, 2, Hauptstr. 34, Germany.

839 N. R., 9, Dabir East, Kumbakonam—The following are some of tea merchants and estates; please negotiate with them direct: A. Tosh & Sons, 11/1, Harrison Road, Calcutta; Bhattacharjee & Co., 57, Cornwallis Street, Calcutta; Sanguvalley Tea Co., Akyab; Central Dooars Tea Estate Factory, Panabasti, Jalpaiguri; Dam Dim Tea Estate Factory, Dam Dim, Jalpaiguri. There are a large number of T. Es and Tea merchants detailed list of which may be found in Industry Year Book & Directory.

843 N. M. O., Pretoria—Optical goods dealers and manufacturers of Japan—Asanuma & Co., Osaka Branch, Junkeimachi, 4-Chome, Minami-Ku, Osaka; Kobataya Shoten, 32, Hiranomachi 2-Chome Higashiku, Osaka. (2) The address of Uebersee Post is 1, Salomonsstrasse, Leipzig, Germany. (3) Imitation jewellery dealers of India: Hira Lal Nandalal Khettry, 154, Ashutosh Mukherjee Road, Calcutta.

844 B. S., Mittra—Envelope making machines may be had of Oriental Machinery Supplying Agency Ltd., 20, Lal Bazar St., Calcutta. They can also supply you all particulars about the manufacture of envelopes and specifications of the machines.

845 R. K. C. L., Benares City—Caustic soda may be had of Imperial Chemical Indus-

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Profit 1000%

Manufacturing specialities in spare time.
No experience or capital required. Write
for details (enclosing stamp if possible) to—
LEAGUE OF PROSPERITY PLANNERS,
2B, Bela Road, Delhi.

tries (India) Ltd, 18, Strand Road, Calcutta. They are the manufacturers of caustic soda and wholesale suppliers of the same in India.

847 A. L. S., Sadri—(1) There's nothing as red sulphur; you perhaps mean antimony sulphide which may be had of Bansidhar Dutt 126, Khengrapatty, Bara Bazar, Calcutta. (2) Cutlery dealers: Haji Abdul Karim Moosa & Sons, 185, Juma Musjid, Bombay 2; K. N. Ajani, 102, Swadeshi Market, Bombay 2. Toy manufacturers:—Cooky & Co., Camp, Poona, Mistry & Co., Opp. Crawford Market, Bombay. (3) Glassware merchants of Bombay—A. Dostmahomed & Co., 105, 107, Bhandari St. (Chakla St.) Bombay; Ebrahim Peer Md. & Co., 112, Chakla St., Bombay. Varnish & Paint dealers:—Abid & Sons, 301, Sheikh Memon St., Bombay; Blundell Spence & Co. Ltd., Rustom Bldg., Churchgate St., Bombay.

848 M. R. D., Rangoon—The following is a formula of black varnish:—Shellac 8 parts, Rosin 5 parts; Lamp black 1 part; Alcohol 94% 32 parts. If a dead black be required, use the same proportion of ingredients, with oil of turpentine as the solvent.

850 N. K. S., Agra—(1) Method of bleaching fat will appear in an early issue of Industry. (2) Wants to be put in touch with manufacturers of and dealers in Swastika brand ghee.

851 N. N. P., Karachi—Consult a physician. This is not in our line.

853 M. G. & C. S., Ludhiana—The following are glass and glassware merchants:—A. N. Malik & Sons, Rawalpindi; Amir Chand & Sons, Rawalpindi; Upper India Glass Works, Ambala City; Abdul Rahim & Sons, Elphinstone St., Karachi; Byramji Edulji & Co., Victoria Rd., Karachi; Haji Zakaria Abdul Satar, Booras St., Camp Karachi; Md Shafi & Co., near Qutab Rd., Delhi.

854 B. N. D. & Co., Bhimber—(1) We do not know the industrial use of "Bentonite" which you have sent. You may send your

article for analysis to R. V. Briggs, 8B, Lal Bazar St., Calcutta. As far as we know it is not used in refining sugar nor is it used in making gramophone records. (2) Wants to be put in touch with dealers, brokers, exporters or importers "of Dharak," Ambala Raitha, Harriars and Bhakarr.

858 G. S. C., Proddutur—Addresses of dye merchants and importers:—Adamjee Bhaijee Rangwaila, 396, Katha Bazar, Bombay; National Aniline & Chemical Co., Ballard Estate, Bombay; Haverro Trading Co., 15, Clive St., Calcutta. Seth Colour & Chemical Works Ltd., 3, Armenian St., Calcutta.

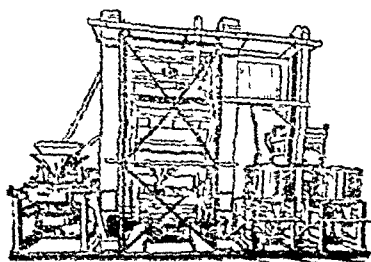
860 K. C. R., Macheria—The stones as per sample seem to have no industrial use.

862 K. & C., Bareilly—Yes, you may start the oil mill to extract groundnut oil (Mung Phali). This oil has extensive market in Madras presidency and also all over India. It is chiefly used for edible purposes and in soap and hair oil making. The plant with estimate may be supplied by Burn & Co., 12, Mission Row, Calcutta, and Mazagaon Rd., Bombay.

863 S. I. A., Gaya—For sugar manufacturing machinery, estimate of the plant, and every other information please write to Balmer Lawrie & Co. Ltd., 103, Clive St., Calcutta, and Bhowani Engineering Works, 56, Gouribari Lane, Calcutta.

864 B. S. & C., Bhimber—(1) See No. 854, (2) Wants to buy Bentonite.

865 P. C. N., Ahmedabad—(1) A few addresses of Indian paper mills follow:—Andhra Paper Mills, Rajahmundry; Deccan Paper Mills Co Ltd, 815-816, Bhowanipeth, Poona; Lucknow Paper Mills, Lucknow; Titaghur Paper Mills, Chartered Bank Bldgs, Calcutta; Bengal Paper Mill Co Ltd, 103, Clive St., Calcutta. (2) Stationery goods dealers:—Bombay Stationery Mart, Victoria Bldg., Fort, Bombay; Great Indian Stationery Co, 365, Hornby Rd, Bombay; Bengal Stores, Chowringhee Place, Calcutta; Oriental Stationery Supply Co., 7, Bentinck St, Calcutta (3) Glassware merchants of Japan:—



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Fukuji Shoten, 23, Kajiyamachi, Minamiku Osaka; R. Fukushima Shoten, Andojibashi Bldgs, 44, Andojibashidori, 1 Chome, Minamiku, Osaka; Hosoda Trading Co. Ltd., 30, Minami Kyutaromachi, 2 Chome, Higashiku, Osaka. (4) The following firms can import for you any Japanese article you may require:—Indo-Japanese Commercial Museum, 135, Canning St., Calcutta and Mitsubishi Shoji Kaisha Ltd., 135, Canning St., Calcutta

870 C. M. M. & Co., Jullundur City—(1) Please enquire of Balmer Lawrie & Co., Ltd., 103, Clive St., Calcutta. (2) Ordinary printing ink is not a fast colour, hence, it cannot stand washing. An exhausted article on Textile printing appeared in October '34 issue of Industry which you are advised to consult (3) The following is a good recipe of roller composition: Glue 64 parts; water 48 parts; linseed oil 96 parts; molasses 64 parts; calcium chloride 3 parts; powdered rosin 8 parts. Soak the glue in the water and then liquefy by heating. Then stir in the oil first heated to 150°F. Then add the molasses and the calcium chloride and finally the fused rosin. The latter ingredient is only to be added when very tough rollers are required.

871 P. & C., Shikarpur, Sind.—(1) The process of making castor oil fit for medicinal purposes will appear in an early issue of Industry. (34) Some addresses of cigarette manufacturer follow, please negotiate with them direct:—Golden Tobacco Co., Gaya Bldg, Masjid Bunder Rd., Mandvi, Bombay; Zenith Tobacco Co., Bombay; Western India Cigarette Co., 10, Elphinstone Circle, Bombay; Imperial Tobacco Co. (India) Ltd., Virginia House, 37, Chowringhee, Calcutta; and Boguslavsky Alex Ltd., 55, Piccadilly, London, W.1. (3) Can supply Virginia leaf tobacco said to be pure and cheapest. (4) Wants to be put in touch with piece-goods makers.

872 S. C. M., Pabna—(1) Go through Cotton Dyeing and Printing, price Re. 1-8 only, published from this office; and for higher knowledge the following books:—Principles of Dyeing by G. S. Fraps price 9s. Manual of Dyeing, 2 vols. by E. Knecht, C. Rawson and R. Loewenthal, price 42s.;

The Chemistry of Dyeing by J. K. Wood 3s. 6d. Artificial Dye Stuffs, Their Nature, Manufactures and Uses, by Ramsey and Weston price 1s. 9d. including postage. The books may be had of W. & G. Foyle Ltd., 119-125, Charing Cross Road, London W.C.2 (2) Acid blue may be supplied by Fuzle Husain & Bros., 44, Armenian St., Calcutta.

875 B. C. G., Rangpur—If you want to earn 40 to 50 rupees a month by an investment of Rs 200 to Rs 250 you will have to take some industry of art and skill such as smithy, cutlery, cabinet making, photography, painting, enlarging, block making etc, etc; for which preliminary training is necessary. There are many industrial institutes imparting training in different lines. Please select your line first.

877 S. P. P., Koregaon—(1) Envelope making machines as required may be supplied by Oriental Machinery Supplying Agency Ltd., 20/1, Lall Bazar St., Calcutta. They will also furnish you with estimate and necessary information on application. (2) The issue of Industry (August 1934) containing the exhaustive article on envelope making is yet available on payment of as. 6 only.

879 T. S. C., Karadacheri—With such a small capital as Rs 50 you may begin canvassing of toilet articles, and if possible howking sundry goods. Agency may also be undertaken of patent medicines, fancy goods, etc.

880 H. C. M. & S., Ambala—(1-3, 5) Tin can making machinery may be supplied by Bradley & Burch (Ilford) Ltd., Sunnyside Rd., Ilford, England. They will furnish with estimate and mode of manipulation with necessary information on the subject on application. (4) Yes, it will be profitable and your capital of Rs 25,000 will be enough to run the factory on
881 T. N., Bhuvanagiri—Thread and lace twisting machine may be supplied by W. J. Alcock & Co., 7, Hastings Street, Calcutta They will furnish you with estimate and every other particulars on application.

882 L. S. & C., Mirzapur—The following firm of Japan can supply watch glasses. Standard Trading Co., Yutaka Bldg., Utsubo Minamidori 2-Chome, Nishiku, Osaka.

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On big commission to sell our Swadeshi Fountain Pen Ink, Gloy Paste and liquid Gum. For particulars write to:—
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BOMBAY No. 4.

MITRA BROTHERS.

17-19, R. G. Kar Road, Calcutta.
Phone No. B.B. 682.

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POTAS CHLORATE, ACID ARSENIC,
ACID TANNIC, POTAS BICHROMATE,
MANGANESE, ACID GALLIC, RED
PHOSPHOROUS, COBALT OXIDE,
ACID CARBOLIC.

883 S. Z. A. Tonk Raj—(1) Work heart and soul in your own business established by your father, and try to enlarge the same with all your might. A business with least capital to yield greatest profit is the universal cry. It must necessarily be a very rare thing, and only the pucca (veteran) businessman can find it out. The profit of a business depends on many things among which the skill of the doer, resources, and environments count the most. Dive deep into the business you have, struggle hard with your body, brain, and purse and the pearl you seek will come into your hand when time will mature. (2) We cannot secure you any job. (3) Dealers in stationery goods:—Bombay Stationery Mart, Victoria Bldgs., Fort, Bombay; Great Indian Stationery Co., 365, Hornby Road, Bombay; Bengal Stores, Chowringhee Place, Calcutta; Commercial Stationery Mart, 28, Radha Bazar Street, Calcutta. Hosiery:—Asiatic Knitting Commercial Corporation Ltd, 307/9, Hornby Road, Bombay; Coronation Woollen and Cotton Hosiery Factory, Parcel, Bombay; D. N. Basu & Co., 24/2, Cornwallis Street, Calcutta; Kalighat Hosiery, P21/3, Lake Road, Calcutta; Umbrella.—Ebrahim Currim & Son's, National Umbrella Factory, Princess St., Bombay; Royal Umbrella Mart, 132, Abdul Rehman St., Bombay. Glassware:—Mahomedally Allibhoy Kachwalla, 199, Abdul Rehman St., Bombay; A. Dostmahomed & Co., 105, 107, Bhandari St (Chakla St.) Bombay; Satcowri Das 196, Old China Bazar Street, Calcutta. Sitanath Law & Co., 2/3, Swallow Lane, Calcutta. Rubber Shoes.—Universal Rubber Works, Bombay 9; United Rubber Works, Tiljala, Calcutta; Bata Shoe Factory, Konnaga, Hooghly.

884 K. T. R. S., Vizianagram—For fountain pen engraving machine write to W. O. Hickok Mfg Co., Harrisburg, Pa., America

885 S. D. V., Mandi State—The following firms deal in Simul cotton:—Inland Produce

Trader, 84 A, Clive Street, Calcutta; R. K. Modi & Co., 23, Canning Street, Calcutta and M. M. Ispahani, 51, Ezra Street, Calcutta.

891 M. L. W. C., Arrah—Western product of liquid gold may be chemically analysed by R. V. Briggs, 8B, Lal Bazar Street, Calcutta; and Sudhindranath Sen, 6, Kirti Mitter's Lane, Shyambazar, Calcutta.

892 Y. Y. Pedapudi—To secure partner, advertise in leading magazines to that effect.

893 M. L. M., Kamoke—All kinds of secondhand machinery are sold by Industrial Engineering Co., Pydhowni, Tram Junction, Bombay 3. You may enquire of them. Boot polish making new machine may be had of W. J. Alcock & Co., 7, Hastings Street, Calcutta.

898 C. P. A., Kandla Kutch—(1) M. O. P. button making tools etc. may be supplied by Oriental Machinery Supplying Agency Ltd, 20, Lal Bazar Street, Calcutta. They will also furnish with necessary information on application. (2) Up-to-date World Trade Directory may be had of Kelly's Directories Ltd, 186, Strand London W.C.. Refer to them for price.

899 A. H. S., Mandvi—(1) An exhaustive article on manufacturing dry cell appeared in May 1934 issue of Industry. (2) Vegetable ghee manufacture or hydrogenation of fats and oils appeared in May 1933 issue of Industry. Pars gold may be imitation gold or rolled gold. If it is rolled gold there is no difference between this and pure gold but imitation gold is composed of certain alloys with a small percentage of pure gold. (4) Foreign musk may be had of B. K. Paul & Co., Ltd, 1 & 3, Bonfields Lane, Calcutta. (5) That salt may be advantageously used in soap is not always true. There is time and place of using salt in soap vide Manufacture of Soap published from this office.

901 M. Y. K. S., Jullundur City—(1) Process of making double boiled linseed oil will be found in March 1935 issue of Industry. (2) An article on spirit varnish making will be found in March 1935 issue of Industry. (3) Formulas of ready mixed paint appeared in July 1934 issue of Industry. (4) Process of

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RASIKLAL & CO., Post Box 2228, Bombay 2.

manufacturing turpentine oil will be found in February 1935 issue of Industry.

902 B. D. M., Camp Poona—Small cigarette making machine may be had of Erickson & Co., Navsari Bldgs, Hornby Road, Bombay

903 J. S. G., Bijapur—(1) For preparing ghee from butter you need not add salt, sugar, etc. An article on ghee manufacture appears elsewhere in this issue. If you go through the article you will get all the information required. (2) Lemon juice is a cure for sea sickness hence lemon juice is largely consumed by shipping companies.

906 D. R., Benares City—Malt and malt extracts are manufactured by Bengal Chemical & Pharmaceutical Works Ltd., 31, Chittaranjan Avenue, Calcutta and Bengal Immunity Co. Ltd., 153, Dharamtala Street, Calcutta.

907 G. K. G., Katni—(1) Oil milling machines may be had of Marshall Sons & Co. Ltd., 99, Clive Street, and Burn & Co., 12, Mission Row; both of Calcutta. The above firms will supply you with an estimate for starting a factory with their machines. (2) You may write to the Superintendent, Calcutta Engineering College, 18, Ekdalia Road, Ballygunj, Calcutta.

911 M. R. B., Chinchani—(1) Following is a recipe of mosquito lotion: Oil of pennyroyal 8 oz.; oil of sassafras 7 oz.; rectified spirit 16 oz. Mix To drive off mosquitoes shake the bottle and spray a quantity of the solution with a sprayer. (2) A good recipe of universal developer will be found in November 1934 issue of Industry. (3) Yes, you can make rubber stamp on a small scale. For materials and other equipment write to B. N. Bysack, 1/1, Ramchand Ghose Lane, Beadon Street, Calcutta.

912 C. D. C. Chinchani—Your enquiry being in the nature of an advertisement should not be published. You better write direct to jewellers, goldsmith, silversmith, etc., for selling die.

916 A. S. F., Tuticorin—You better consult a physician for medical preparation.

917 N. R. S., Koppakadur—A good formula of washing soap similar to Sunlight soap will be found in August 1934 issue of Industry.

918 I. B. G., Gaibandha—(1) Process of preparing tea tablets will be found in November 1933 issue of Industry. (2) If you keep tea tablets in airtight cans these will last long without being decomposed. (3) Cut the handles of brushes according to required design.

919 D. P., Hazaribagh—In manufacturing coal gas ammonia is obtained as a by product. For detail information you should go through the chapter on Coal Gas in any book of chemistry.

920 M. E. S., Karachi—A good recipe of tea flavour appeared in October 1933 issue of Industry.

921 T. T. D., Nuwara Eliya—You may refer your query to the Consul-General for Japan, 26-27, Dalhousie Square, Calcutta. You have to invest Rs. 50,000 for starting a glass factory.

922 C. A. K., Colombo—You may consult Ubersee Post, 1, Salomonstrasse, Leipzig, Germany; American Exporter published by Johnston Export Publishing Co., 370, Seventh Avenue, New York City, U. S. A. and British Trade Review, 113-115-117, Caveron Street, London E.C.4.

923 K. L. B., Multan Cantt.—(1) Following is a recipe of baking powder: Tartaric acid 2 lbs.; bicarbonate of soda 3 lbs.; flour 3 lbs. Powder the ingredients and thoroughly dry separately by gentle heat. Mix them in a dry place, sift the mixture and at once put into packages. This will yield a good baking powder for raising flour in the preparation of bread and cakes. (2) You may use the following preparation for driving away mosquitoes: Oil of pennyroyal 2 oz.; oil of sassafras 2 oz.; petrol 4 oz. Mix and put in a well corked bottle.

924 A. H., Mudigere—All the articles you require may be had of Nilmoney Halder & Co., 106, Radha Bazar Street, Calcutta; D. N. Bhattacharjee & Sons, 33, Canning Street, Calcutta; Dhar Bros. 82, Harrison Road, Calcutta; L. N. Chunder & Co., 114, Radha Bazar Street, Calcutta, and Ray Coomar & Co., 111, Radha Bazar Street, Calcutta.

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REVIEW OF BOOKS

PLANNED ECONOMY FOR INDIA by Sir M. Visveswaraya, K.C.I.E., D.Sc., LL.B., M.I.C.E. Published by the Author, Bangalore City. Pages 432.

In this admirable book Sir M. Visveswaraya has presented a comprehensive scheme of planned economy for India. Since the days of the introduction of the memorable Five Year Plan in Russia in 1928, the necessity for similar planning has dawned upon the progressive countries of the West. Even the backward countries have taken recourse to some modified form of national reconstruction plan to stave off the effects of depression and to bring prosperity to the land. It does not require any mention that India with her starving millions and dwindling trade and industries should stand in need of some recovery plan. It is a happy augury of the times that the matter is seriously engaging the attention of our economists and legislators.

Before an economic plan can be prepared, it is necessary to have a fair knowledge of the defects in our industrial and economic structure. Sir Visveswaraya has therefore been at considerable pains to lay bare the facts and figures relating to India as compared with the advanced countries. He shows that the country labours under two-fold disabilities, one due to the continued inattention to keep her in step with the outer world and the other to the effects of the recent world trade depression. The obvious result of this suicidal policy of *laissez faire* has been that the industries are neglected and that there has been an inordinate pressure on the land. The income per capita from agriculture in India is Rs. 59, while that from industries is Rs. 12. Comparison of similar figures relating to other countries reveals the lamentable condition prevailing in India. In the United Kingdom the per capita income from agriculture is Rs. 62 and from industries Rs. 412, in America Rs. 175 and 721 respectively, in Japan Rs. 57 and Rs. 158 respectively. The logical inference from this is that India has to depend for much of her necessities upon foreign countries. The avenues of employment are limited and the facilities of technical and industrial training are meagre. The position in sooth cannot be passed over with complacency.

In the present volume Sir Visveswaraya seeks to set forth a project of developments which will double the income of the country from Rs. 2,500 crores to Rs. 5,000 crores in ten

years. The development works to be undertaken to produce the desired end have met a most careful scrutiny. He has plainly showed the difficulties in the way of realisation of the aim. The main obstacle, he points out, is that the Government does not often find itself in agreement with the people regarding the steps to put India on the right track. While the people consider that India's salvation lies in rapid industrialisation by following a sound plan of organization, the Government would like to keep India as an agricultural country, supplying raw materials to the United Kingdom and consuming finished products of that country. The tariff policies, commercial treaties and commercial safeguards imposed in the new constitution stand in the way of progress and have been analysed in detail.

Sir Visveswaraya advocates two measures for the betterment of the Indian conditions, first, national economic plan for five or ten years at a time and secondly an organization like the economic councils to work the plan and to remedy the accumulated deficiency of the country and to be responsible for the country's economic activities. There should be a Central Economic Council which shall prepare detailed proposals of the plan which in its turn shall be controlled by a Development Department. It will be duty of the latter organisation to watch the progress of the plan and the march of events. It is also proposed that each provincial government will have Provincial Economic Councils and Development Departments and local economic councils in the cities and towns. The development work are classified under seven heads, viz., industrialization, agri-

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culture and mirror industries; public works, public utilities, transport and power supply; commerce; finance and banking; other special developments including business training, military training, education, etc, unemployment. The cost of operation of the plan is estimated at Rs. 10 crores per annum. Of this sum Rs. 2 crores will be required and should be provided for by the Central Government; and Rs. 8 crores should be found by the various provincial governments. It is also estimated that a loan of at least Rs. 500 crores will be required in the first instance, for financing new industries, new railways, shipping enterprises, etc. An active co-operation among the Government and the people in the matter of economic reconstruction is obviously the pre-requisite for success of the scheme.

The book is comprehensive in nature, and thought provoking. It should deserve perusal.

EARTHQUAKE AND DESIGN OF STRUCTURE by J. Bakshi, Executive Engineer, Cuttack. Published by C. Bakshi, Cuttack. Parts I & II, Pages 90 & 91 respectively.

Mr. Bakshi, the author of the book under review, had a miraculous escape during the great earthquake in North Bihar on January 15, 1934. He was in executive duty in Bhagalpur in public works department. Many towns felt the tremendous shock of the earthquake, and presented a most desolate spectacle with huts, and buildings in debris. In his professional career he stood in immediate need of advice regarding repairing and constructing buildings in this zone but the existing literature seemed to be quite scanty. It was also held that North Bihar will remain to be the seat of seismic activity for some time. Mr. Bakshi, therefore, began to think seriously what security against the havoc of earthquakes on human life, and property can be attained through the medium of science of engineering. The present volumes are the results of his deep study and keen observations on these matters.

The book is divided into two parts. The first part is rightly devoted to study of the causes of earthquakes, and the manner of their

propagation. The author discusses in detail the special features of the various earthquakes, and makes a broad classification of them. He also gives the details of the Great Earthquake, and the cause of such unusual destruction of Monghyr, and damages in other places.

Equipped with these facts and figures Mr. Bakshi proceeds to give his practical suggestions regarding security of the structures. He begins with a summary of the lessons derived from the last earthquake, and discusses among others such problems as, safe height of buildings in different localities, all re-inforced concrete structure, all re-inforced brick structure, nature of stresses, and how different waves affect different types of structures, bearings of beams and lintels, different forms of binders, design of lintels, roof, sills of openings, foundation to be allowed, bridges, etc. The book also treats with the manner in which it is possible to repair the earthquake-damaged building, and to bring out immediate relief. Except a few chapters which are highly mathematical, the book is written in a popular way so that its conclusions may be availed of in building new houses in this zone of danger.

INDIA IN 1932-33 issued by the Bureau of Public Information, the Government of India. Published by, Manager of Publication, Delhi. Pages 197, price Re. 1/4/-.

Like its predecessors the present report which has been prepared for presentation to the Parliament narrates the political and administrative activities during 1933 and presents a comprehensive review of the agricultural, industrial, commercial and financial situation during 1932-33. The report, in fact, leaves no Government department untouched and surveys the main works done as regards public health, education, archaeological survey, botanical survey, zoological survey, civil aviation, posts and telegraphs, railways, roads, irrigation, veterinary, etc. The chief interest of the book lies in Chapters I and II which treat with politics, administration and defence. It appears that the course of political activity in India during 1933 was conditioned throughout by the consistent adherence by Government, despite opposition from influential quarters, to its dual policy of maintenance of law and order and progress towards the introduction of constitutional reforms. The period covers the steady decline of the civil disobedience movement, fasts performed by Mahatma Gandhi for removal of untouchability, white paper and congress programme. The chapter on Agriculture, Commerce and Finance are most illuminating and are replete with facts and figures of immense value to the traders and businessmen.

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NOTICES & REVIEWS.

[Manufacturers sending specimens and samples of their products for notice and review may please note that no notice is published of medicinal preparations and allied substances in this section.]

Notepapers & Envelopes.

We have much pleasure to receive samples of notepapers and envelopes from Dhoomimal Dharamdas, Chaori Bazar, Delhi. These stationery articles have been placed in the market in different sizes to suit every taste.

Bengali New Year Calendar.

We have received from N. Banerjee, 48, Srigopal Mullick Lane, Calcutta two pictorial wall calendars. He is the manufacturer of "Parul" brand hair oil and "Matoarah" handkerchief perfumes.

Peanut Butter.

We have received a sample phial of peanut butter from Variety Manufacturing Coy., P46/1, Sadananda Road, Kalighat, Calcutta. It is entirely made by machine.

It is delicious to taste and pleasing in appearance. And being richer in vitamin contents, the stuff will make an excellent basis for the breakfast menu.

Flower Dust.

We are glad to receive a packet of Indian flower dust from The Kashmir Emporium, 22, Sundaram Pillai Lane, Vepery, P. O. Madras. This is prepared with the choicest flowers and is claimed to guard clothes against the attack of moths. Being a powerful antiseptic it is claimed to prevent contagious diseases such as cholera, small pox and other epidemic. We wish the product a wide sale.

Paisa Fund.

We are extremely delighted to get a copy of The Paisa Fund Silver Jubilee Number, which is profoundly illustrated. Paisa Fund is a nursery of organised effort standing on the foundation of Swadeshi, it is the panacea of our economic ailments. The book deals with the history of the fund, its glass works and its other various activities for the development of industries in the Maharashtra country. The story of this important organisation is not only of immense interest to its contributors but also it is equally interesting and instructive to others in their industrial pursuits. We hope that the general public will come forward and contribute their mite to this fund so as to widen the commercial and industrial activities of this organisation.

Diary for 1935.

We have received from Dr. G. T. Sippy, Post Box No. 3, Hyderabad, Sind a pocket diary containing many useful hints on mouth hygiene. The price of a copy of this diary is 12 annas only.

Dhananjaya Dharwar.

This Kanarese journal solely devoted to commerce, industry, banking and insurance has brought out a special issue dealing with the industries in Karnatak. This number gives a lot of information about small and big industries in the district. The information about the raw material available is very useful for enterprising industrialists. The annual subscription of the journal is only Rs. 2/4/-. We wish the journal every success.

Pamphlet on Cottage Industries.

We have received a copy of Economic Importance of Cottage Industries and their Progress in Bihar and Orissa by K. S. Rao, L. T. M., A. T. I. In this pamphlet the author discusses the importance of home industries and handicrafts in providing employment to artisans and the larger portion of agriculturists who have to sit idle for at least six months in a year for want of employment. For the improvement of the economic condition of the artisan the author suggests the introduction of labour-saving appliances and modern processes of manufacture. Then he gives a general survey of cottage industries of Bihar and Orissa wherein he deals with the number of persons employed in different industries. Finally he gives a brief description of some of the important cottage industries as well as the working of some technical institutes existing in the province.

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Scientific Inhaler.

We have received from Messrs. Punjabi & Co., Khanpur, P.O. Shikarpur, Sind a sample of inhaler. It is of German make and is really an article that will give satisfaction to its users.

A New Monthly.

We have the pleasure to receive a copy of "Better Money" a new monthly bulletin of monetary reform by way of the remonetisation of silver and a fuller use of National Credit. The January issue under notice contains articles from no less a distinguished writer than Sir M. de P. Webb, C. I. E. We wish the journal a long and eventful career.

Trade Enquiries.

(To communicate with any party write to him direct with name and address given below mentioning Industry).

758 B. G. Naidu, Vaccination Depot, Nagpur—Wants to be put in touch with suppliers of black tracle.

850 The International Trading Co., Agra—Wants to be put in touch with the manufacturers of confectionery, biscuits, English bread, cake, etc.

869 Manindra Nath Mozumdar, Tara, Dacca—Wants to be put in touch with dealers in castor seeds in Bombay.

873 Rajanbhai Meherally & Son, Jassani Bldgs., Hains Road, Bombay No. 11—Want to be put in touch with suppliers of bristles in South India.

888 Hukamchand Goyal, M.A., B.Sc., L.L.B., Muzaffarnagar—Wants services of an expert who can manufacture cardboard.

895 Vizialaxmi, C/o, Post Master, Akividu, M. S. M. Rly.—Wants to be put in touch with dealers in ghee, eggs and coconut in Rangoon.

914 Malla Janardana, Palasa, Ganjam—Wants to be put in touch with the suppliers of soapnut.

956 K. Narasinha Murthy, Earline Road, Shimoga, Mysore—Wants a capitalist who can finance some lucrative business.

964 Ali Mohammad & Sons, Panna—Can supply gum, Mau, and Shahabad honey.

1074 National Manufacturing House, Daraganj, Allahabad—Wants emery and starch cloth for preparing emery cloth.

1088 M. Esmailjee & Sons, Napier Road, Karachi—Want to be put in touch with Kangra and Dehra Dun tea merchants.

1110 H. Dutt, D. M. Medical Hall, Talag Mahal, Kayasthana Road, Cawnpore—Can supply dill and celery seeds.

JULY ISSUE OF INDUSTRY.

(In the Press).

The July issue of Industry which will be published in the first week of the month will be a special number dealing with Fruit Culture and Preservation including the Manufacture of Jams, Jellies, Morabbas, etc. Besides it will contain the usual features such as Small Trades and Recipes; Formulas, Processes and Answers; Brief Queries and Replies. Any friend of our subscribers will get a copy free as sample on application to the Manager, Industry, Shambazar, Calcutta.

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Subscription money is always payable in advance or by V. P. P. The foreign subscription should be sent by B. P. O.

At the time of sending a V. P. P. only the current number is generally sent. The previous issues of the volume are sent per bookpost on receipt of the value of the V. P. P.

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Ordinarily advertisement forms close on 20th of the month and all copies and remittances must reach this office at least two days before the date, and for special issues, 10 days before that unless otherwise notified.

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Industry

THE MAGAZINE FOR MANUFACTURERS & BUSINESSMEN.

VOL. XXVI.

CALCUTTA, JULY, 1935.

NO. 304.

Expansion of Occupation.

DURING the tropical fruit season we make this number a Fruit Culture Special because we want to draw particular attention of our youngmen to the vast prospective field of occupation, which our fruit culture and industry can provide.

India being partially within the Tropics and partially in the Temperate zone is capable of producing all sorts of fruits. She can produce fruits suitable for Eastern taste as plentifully and in as many varieties as she can produce them of Western taste and appreciation. Yet fruit culture in India is a culpably neglected service.

Although rich in potentiality for immense growth, and in ramified possibilities of treatment and trade in fruits and fruit preservations and preparations, our fruit trade is in untrained hands who do not and cannot improve cultivation or develop wider and richer markets, within the country and outside.

Gardens which survive the neglect of rich planters give nearly all the fruits our countrymen use. There are fruit gardens extensively dotting the country without producing any fruits worth the name. They require research work for their betterment which is practically nobody's concern. As long as the fruit collectors call for whatever harvest they can gather, the produces are prized. And the collectors do not concern themselves with improvement of the gardens or of the produces.

Here is an immense field for our educated middle class youngmen—to recondition the old gardens and to create new ones, to carry on research work and develop species, to preserve fruits and prepare new products and after all to create new markets and new customers.

An opportunity can be created without much fuss in every village in this country for a progressive expansion of employment in which every one will benefit, and people within the country and outside will be supplied with an article enjoyable to everyone. The following pages lead to definite propositions.

FRUIT CULTURE AND PRESERVATION.

FRUIT is a natural gift to man. It contains large quantities of vitamins, and it has nourishing, digestive, and laxative properties. It is for this reason that fruit enters so largely in the food of the people of Western countries. In Europe and America, a considerable area is devoted to fruit crops of various kinds. Thus, France has 1 acre under fruit for every ten persons. The U. S. A. claims 1 acre for 56 persons but in India 450 persons depend upon one acre for their supply of fruit. It will be seen that India is far behind other countries in the matter of fruit production, and consequently in the use of fruit as an article of diet. It is a sign of the time that the various Departments of Industries now not only take an active interest in the cultivation of fruits but also in the utilisation of the surplus lands, which are considered as wastes in order to remove a portion of the unemployment among the educated middle classes.

Fruit culture is a most neglected occupation in India; yet it stands within reason that science and skill can bring about great improvement in the growing of fruits. Although there are many fruit gardens in India yet few are well kept. The rich man plants specimens of all kinds of fruit trees, and leaves them to Providence; and the cultivator who earns a living from his fruit trees adheres to ancient varieties, and to ancient methods of culture, pruning, and irrigation. In no department of horticulture is there such a chance of genuine improvement as in fruit culture, and we propose to

give in this article a direction regarding successful fruit growing.

CONSIDERATIONS IN SELECTING A SITE.

The chief factor to success in fruit culture is the economic consideration of the following:—

BUSINESS ASPECT.—Though soil is of course of very great importance to the fruit grower, it is as well to give the prior place to the business aspect. The fruit grower must always bear in mind that he has to deal with the most perishable produce. He cannot hold this produce indefinitely or even for a long period, it will only travel under favourable conditions.

So important are these considerations of marketing and transit that it is not uncommon to find that the conditions favourable to easy sale, have called into being fruit growing areas which are not specially favoured by soil, even though there are many admirable fruit soils still uncultivated and likely to remain so, owing to their inaccessibility from a business point of view. For both the large and small grower there are various channels of disposal open, but both will do well to make up their minds for what type of customer they are going to produce, and whether they are favourably situated to reach him, before settling down to plant fruit. Whether a man embarks upon a wholesale, retail or direct trade will depend both upon the size and situation of his holding and the type of his produce, as well as upon his business capabilities.

SOIL—Second only to business consideration is the question of soil suitability. It bears an important part in the production, and quality of fruits. This has been the cause of failure in many places. This is always true that proper tillage, cultivation, and manuring may change the soil for fruit cultivation, but one should always look forward natural adaptation for a particular fruit.

The average best soils for fruit ranges from a sandy loam to a clay loam with almost neutral or a little acid soil. For fruit, a soil apt to dry out rapidly in certain seasons is dangerous. Similarly a water-logged soil, is bad for fruit culture. It must be remembered that a fruit grower has to invest a large amount of capital in land and hence before selection of site he should consider the particular soil that will serve his purpose best. Then he can with confidence actually enter into business and reap benefit therefrom.

CLIMATE.

The climatic conditions of India are not at all favourable for the cultivation of all varieties of fruits for a particular soil. There are two extreme features in Indian climate—the wet and the dry. The former extends from the beginning of the monsoon rains in June to the middle of October, while the latter from November to February. As most of the monsoon rains come in the wet season, the land gets dried very badly in the dry season. It is for this reason that fruit trees especially the bush plants suffer a good deal during the dry months of winter. The reason is that as the trees are shallow rooted and remain generally covered with weeds, they suf-

fer for lack of sufficient moisture in the soil in the dry season. It is better to hoe the trees, use leaves or straw so as to conserve the soil moisture.

KINDS OF FRUITS TO GROW.

After a due consideration of the soil, and climate the grower may choose the kinds of fruits to grow in his land because a kind of fruit that is successfully grown in a given place is not necessarily grown satisfactorily in some other location especially under different soil conditions. Therefore a definite advice on a particular kind of fruit can only be given when a knowledge of the influencing condition is thoroughly known. At least a general knowledge of the neighbouring areas is required for such an advice.

Fruit growing may be considered from two points of view, (1) growing fruits as an amateur gardener for pleasure, and (2) growing fruits for profit. If the fruit is used for home consumption, quality is considered most. But, when commercial interests are the purposes of the grower heavy bearing, good lasting quality, uniform ripening, and good marketable size are the most essential characters desired.

Before purchasing the land the prospective grower should have a knowledge of the locality in which he selects the site for the garden.

PREPARATION OF THE LAND FOR PLANTING.

The feeling that fruit trees give returns only after a considerable waiting period often impels people to plant too hastily and without due preparation. It is a great mistake. Two things should be aimed at before planting:—

(a) To get the soil into good condition,

(b) To clean it of serious weeds.

By getting the soil into condition, is meant getting it into as good a tilth as possible. The soil should be deeply ploughed, and left rough to the action of the elements. This generally takes a year to make it suitable for plantation. This delay in converting the soil into condition will no doubt, be amply compensated by the succeeding growth and bearing of trees. If the trees are cultivated in an unprepared soil their growth will not be satisfactory, and the creeple condition of trees becomes a perpetual eyesore to the grower. After the clods have crumbled under the influence of the sun, plough again at right angles, and harrow twice. Then just as the rain breaks sow Sann hemp at the rate of 40 lbs. seeds per acre. This will come up vigorously with the rains. After six weeks cut it down and plough it *in situ*; let it rot well and harrow again. At the end of the rains dig the pits for the fruit trees and between them put in a crop of a deep rooting legume to break the subsoil a short season groundnut. Harvest the nuts of this and return the roots and stems to the soil. Harrow again. Then transplant the fruit trees into position on this prepared soil. In some cases this may involve draining and the laying of field drains at anything from 15 to 40 ft. apart, though the chief virtue of many of the best fruit soils is their natural drainage. If there is any suspicion of water logging at certain seasons, drains will be laid before the fruit is planted. The plantation should be ultimately planned so that the roots

from rows of trees do not interfere with the lines of tiles.

Soil deficient in lime will readily respond to a good dressing, and it is surprising how many soils are deficient in this constituent. Lime is desirable for all fruits, for healthy growth and for improving the workability of the soil. Light dressings applied fairly, frequently are usually preferable to one heavy dressing over many years, though the form in which the lime is given will to some extent determine the quantity. Where 10 cwt. of the best ground lime would suffice say, every three years, probably a ton of quick-lime (air slaked) would be more usual, and where chalk is available, to be equally effective larger quantities still would normally be applied.

Conditions of soil may also be improved in many instances by adding humus to the soil in some form. It may be by the ploughing in of a green manure or by the opening effect of a dressing of some organic manure such as shoddy.

Finally the growing of certain crops preparatory to planting fruit may considerably affect soil conditions. Fortunately, the crops which usually bring condition frequently also help to clean the land, thus fulfilling our second aim also. On suitable land, one may grow a rabi crop for the first year after the jungles are cut and burnt down.

Too much stress cannot be laid upon the necessity of fruit planting only on land thoroughly cleaned from serious weeds. Once the land is planted with permanent trees, cultivations become more complicated and expensive. In case of young trees, weeds around the

roots give a definite check to growth, whilst many a young plantation has been completely smothered before ever it has the chance of cropping simply because the ground had not been properly cleaned.

PLANNING A FRUIT FARM.

Fruit trees should be planted in rows. They may be put in two common ways—the square system and the quincunx system. Four trees are put in a square in the former and 5 in the latter. The distance between the trees should be carefully measured and bamboo stakes should be put in to mark out the respective places. Different trees require different spaces for their growth. Oranges and other citrus trees can be put at 18 to 20 feet apart and so with the guavas, lichis need about 20 feet each way, while mangoes and jack fruits are to be planted at about 30 feet apart. If seedlings are planted, they are to be either raised in a home nursery or brought from reliable sources. If possible one should try to raise budded or grafted trees or buy them from reliable nurseries in Calcutta. In the nursery the soil should be well manured either for the seedlings or the grafted or budded plants. In planting trees individual holes should be cut at every stake about a foot and a half wide and the same in depth. These are to be filled with cow-dung and leaf mould mixed with earth. Plant the nursery stock later as opportunity arises. It is always better to ball the nursery stock before they are planted.

The main faults of Indian fruit gardening are (1) close planting, (2) too much watering, (3) lack of drainage, (4)

omission to work the soil, (5) insufficient and ill-balanced manuring. To give a good idea about the correct distances we have tabulated below the principal fruit trees generally grown in India:—

	Feet apart.		Feet apart.
Oranges	20	Small sour limes	15
Vines	10	Mango	30
Guavas	20	Papaya	10
Pomegranates	15	Bananas	12
Peaches	20	Apples	20
Cherries	18	Plums	15
Figs	15	Apricots	20

RAISING YOUNG PLANTS.

To the amateur fruit grower it is advisable to purchase good grafted plants of well known variety from a nursery but to commercial fruit growers they may raise plants by natural or artificial means.

PRUNING.

At the beginning pruning is necessary to give a good shape to the trees. Accordingly careful pruning is required for the first three or four seasons. This treatment will give a good shape to the trees. The first pruning begins when the nursery tree is planted in the orchard. The cutting back at the top induces the growth from the sides which ultimately gives a vase-shape to the trees.

Care and judgment are necessary to prune a bearing tree; because one should know the manner the fruit is borne on the tree. For example, in mangoes and lichis the fruit is borne on the tip of the growth, apple or pear mostly on the fruit spur and jack fruit mostly on the trunks and stout branches. So in pruning each one of these needs a different treatment.

In general, it may be stated that all the sickly and dead branches should be removed and the top of the tree should be quite open to admit light and air. The character of growth of a tree in a large measure governs the method of pruning.

MANURING.

The application of manures can hardly be over-estimated. It depends mostly on the physical condition of the soil and the amount of available plant food which it contains. The application of farm-yard manure that can be preserved carefully at home is very useful in fruit orchards in supplying the necessary plant food. The high land soils, especially the old alluvial deposits are mostly acid. The application of lime in the form of limestone at the rate of 10 to 20 maunds per acre is quite beneficial to fruit growing, especially lemons, oranges, etc.

In fact, the economical use of fertilisers is based on the natural productive capacity of the soil. An intelligent grower should try to use commercial fertilisers, such as bone meal, ammonium sulphate, sodium nitrate, kainite, superphosphate, etc on one experimental basis in a small area and then be guided by his practical knowledge.

The most economic way of applying manure is as follows:—

At time of planting, in the pit for each tree, mixed with the earth, put 15 lbs. farm-yard manure, 5 lbs. bone meal, and 7 lbs. wood ashes. Each year afterwards, increase the farmyard manure 5 lbs., the bone meal 5 oz., and the ashes 1 lb., per tree, up till and including fifth year, and apply this amount after-

wards. Apply the manures before the rains in the irrigation beds and mix well with earth. In soils lacking lime apply 8 oz. slaked lime per tree per annum with the manure. This is, of course, merely a simple scheme for manuring for general fruit cultivation.

GREEN MANURING.

The use of green manures in fruit gardens is very beneficial and economic in the way of solving the fertilizing problem. The ploughing under a green crop supplies the humus to the soil, which is the most important factor that governs the physical condition of the soil. For this purpose legumes are the best. They enrich the soil by gathering nitrogen from the air through the agency of micro-organisms. Another advantage of growing a green manuring crop lies in the fact that it checks the weeds, especially grasses, which are really detrimental to the growth of a tree.

IRRIGATION.

Irrigation water is usually given in India in earth basins round the trunk of the tree. This is desirable at no stage of growth as collar-rot may be induced, and it is frankly absurd when the feeding roots have gone far beyond the narrow bounds of the basin. Irrigation in long narrow beds is best in practice, providing ample water for all roots and leaving a space of soil unirrigated through which air may reach the roots also. When the trees are young, one such basin may run on either side of each row and when old a somewhat broader basin will serve two adjacent rows. It is desirable, however, once every two years to exchange the sites of the basin and the non-irrigated part so

that the irrigated soil does not get packed. Drainage is the removal of surplus water and is the complement of scientific irrigation. To prevent such water standing on the surface, shallow trenches should be run down the slope, one at every 30 ft. apart. These must end in a catchment pit where the earth washed away may be deposited. In the rains, the soil between the trees should always bear a cover crop to prevent undue wash, to keep down weeds, and to be used as green manure. Underground drainage is needed in heavy clay soils. It has been little done in this country as yet. The simplest subsoil drains are trenches 3 feet deep and 1½ feet across. These may be left open or the bottom 1 foot may be filled with loose stones and the top covered over with earth, or a tile drain may be laid in the trenches. Each drain must have a slight slope to make water run in it and an outfall into a *nullah* or catchment pit.

INSECTPESTS ON FRUIT TREES.

The scope of this article would not allow of dealing exhaustively with the pests on fruit trees. It is very often noticed that cultivators are at a loss to save their crops from insect pests. To save the crop they must know how to apply a proper remedy at the proper time.

Generally, the insects damage the crop mostly in their larval or immature stage. They cut the foliage or other parts of the plant, such as the caterpillars, and may be controlled by spraying some poison, such as Paris green or lead arsenate. Sucking insects such as plant lice require an insecticide that kills by coming in contact with them. Kerosene

emulsion or lime sulphur may be sprayed for the purpose. In some cases like the lemon caterpillar, hand picking is the best method of control for young trees, while in others, such as woolly *cophis* the destruction of the infested plant is the only satisfactory remedy.

Some insects cannot be controlled by sprays or hand picking but a knowledge of their life cycle will show an assailable point. Leaf curb in lichi may be controlled by spraying kerosene emulsion but the mango weevil can hardly be controlled by it. For this clean culture and perhaps a wholesale deflowering the trees for three years may give a satisfactory result.

HANDLING THE FRUITS FOR MARKET.

The experienced fruit grower knows only too well when to pick fruits so that they may arrive at their destination in the best marketable condition. He knows too what a change in weather conditions may mean. From his point of view the right time to pick is when it pays best. The inexperienced grower should study these things in the markets themselves.

PICKING.

In picking fruits one should either use a net attached to a long rod, and pick the fruits or use a ladder, and pick the fruits by hand. Plucking the fruits with a sudden twist always removes the stem end which not only increases the loss of water by evaporation, but also exposes the fruit to fungus and bacterial attack. When hand picking is possible, it is better to use a clipper to pick the fruits. The picker must have a picking bag which when full may be emptied in baskets especially made for the purpose. After the fruits are picked they are to

be hauled carefully. They should not be kept in heaps. It is better to wash them in Borohaux mixture and then dry them on bamboo platforms. In picking fruits for market one should pick up the mature fruits but not ripe, as the latter will not stand long transportation.

GRADING.

The fruits should then be graded by hand in 2 or 3 different sizes. This hand grading will remove the culls and only the sound fruits are to be saved for curing for 2-3 days before they are packed for market. This will make the rind to shrink a little and will heal up all the wounds and will keep the fruits for a longer period.

PACKING & MARKETING.

The fruits of each grade should be packed separately in bamboo baskets or wooden boxes. At present fruits in the plains are put in baskets with gunny sacked cover. Such a loose pack is always liable to be pilfered on the way. The growers should put fruits in one basket and cover it with another basket, the interspaces, and both the top, and the bottom being filled up with soft straw. The rims of the two baskets should then be tied with iron-wire. This will ensure a tight pack and a good carriage to distant market, and above all will save the fruits from unnecessary pilfering during transport. The fruits are to be packed in rows either diagonally or straight. Each individual fruit of some variety as orange is to be wrapped by squared-sized tissue papers. If packed in this way the fruits will not only keep better but will stand long transshipment.

PRESERVATION OF FRUITS.

Considering the increasing requests for information regarding the methods

of preserving fruits we are attempting here to explain briefly, and concisely the secret of success in the art of canning, and preserving with some practical suggestions.

It is a fact that a large quantity of surplus fruits go to waste every year or are sold at prices which return little or no profit. Much of these farm products which are wasted for nothing can be canned and preserved or dried both commercially and for home use. As the process of canning has already been dealt with exhaustively in our last May issue it is not taken up here again to increase the volume of this article. Readers are requested to consult that issue if they want a complete knowledge of the art.

METHOD OF COOKING.

Fruits should be cooked over a very hot fire as rapidly as possible to have the finished product sparkling bright, clear, and of a good colour. If slowly cooked, the result, will be a dull, dark, unattractive product. The fruit while cooking, should be well covered with the syrup so that no top pieces will dry on the surface and shrivel before a sufficient amount of syrup has entered the pieces to plump them. Sometimes the syrup becomes thick before the fruit is sufficiently clear and tender, as may happen when a small quantity of fruit is cooked in a large pan. In this case the water in the syrup evaporates more quickly on account of the large surface exposed with the consequence that the syrup gets unusually concentrated. In that case the syrup should be thinned by adding a small amount of water. Commence the process of preserving fruit in a thin syrup, cook rapidly until pieces are clear

and allow them to stand immersed in the syrup overnight. This causes more of the syrup to permeate the fruit and plump it. If this process is carried on gradually, the fruit may be completely saturated with syrup without shrinking. The finished product should keep its original form and should be plump, mellow, and clear.

When acid fruits are added to the syrup some of the sugar is changed to a form which will not readily crystallise, and for this reason the syrup may be made heavier without danger of crystallisation. Since long cooking injures the colour and flavour of fruits, it is desirable to cook delicate fruits for as short a period as possible. After cooking it is submitted to cooling process.

METHOD OF COOLING.

Cooling rapidly after cooking gives the preserves a better colour and flavour than can be secured when they are packed hot. Keeping immersed in the syrup after cooking helps to plump the fruit. Shallow enamelled trays are desirable for cooling. Running cold water beneath the trays will help to cool them rapidly. Tin utensils should not be used, because the fruit juices will be discoloured in it.

PACKING.

After cooling the preserved fruits are packed. Bring the syrup in which they have been standing to boiling, strain, test, and, if of proper density, pour over the packed preserves, and paddle the packed jars to remove all air bubbles. If not of the right consistency for packing, the syrup must be concentrated to proper density by boiling it. A

well packed jar will contain fruits or pieces of fruit of uniform size for filling the space within the jars. These should be arranged in layers in such a way as to give the entire pack a symmetrical appearance.

SEALING.

To seal properly, and to insure safety from mould, it is necessary to process all preserves after packing them into the sterilised jars. This processing may be done in a water-bath by heat below or at the boiling temperature, depending upon the kind of products packed, and upon the length of the time the heat is applied. Since preserves contain so much sugar, which act as preservative, it is only necessary to process against moulds. This may be accomplished by placing the filled jars in a water-bath, heating it to a temperature of 180° to 190°F, and maintaining that temperature for about thirty minutes. Then allow the jars to cool and afterwards seal.

Usually three-fourth pound of sugar for each pound of fruit is allowed for preserves. Firm fruits like pears, apples, mangoes, papaw, are first cooked in boiling water until tender, and then added to the syrup.

Some recipes follow:—

PINEAPPLE PRESERVES.

I.

Pineapple cannot be cooked in heavy syrup until it takes a certain amount of sugar. Either slices, chunks, or spears make nice preserves. The pineapple, must be eyeless, and colourless. After peeling, and coring the pineapple, blanch it in boiling water for 15 minutes. Drain well, and put in cooling pans, and

add 6 lbs. of dry granulated sugar to 12 lbs. of pineapple. After the pineapple remains in the sugar several hours part of the sugar will dissolve and syrup will form. Now the pineapple should be stirred until all the sugar is dissolved. After the pineapple remains in the first sugar 24 hours, it is ready for the second process,

Second—Drain the pineapple. Put the syrup in a kettle, add 4 lbs. of sugar to the gallon of syrup, and cook to 28° on a Beaume's saccharometer. Cool the syrup to 200° and cover the pineapple with this second syrup. Let the pineapple remain in this syrup for 24 hours.

Third—Drain the pineapple the second time. Put the syrup in the kettle, and bring it to a boil. Add the pineapple, cook to 218°F. Take the preserves out into the cooling pans. Let it remain in the syrup for 24 hours before it is bottled. Process for 30 minutes at 180°F.

II.

Pineapple	1 lb.
Sugar	$\frac{1}{2}$ lb.

Peel, core, and slice the fruit, place alternate layers of sugar and fruit in a bowl and allow to stand overnight. Next morning drain off the syrup and boil it for ten minutes, add the fruit, and continue cooking for fifteen minutes, remove from the fire, skim and pack into jars, heat pint jars at 212°F for fifteen minutes in a waterbath (before sealing).

MANGO PRESERVES.

Prepared Mango	2 lbs.
Sugar	2 lbs.
Water	2 lbs.

Peel, and cut the fruits in proper sizes. Dissolve the sugar in water, and boil. Then add the mango pieces and boil the whole for half an hour or until the fruit is cooked, and the syrup is thickened heavily. Then remove from the fire, and allow it to cool; then pour into jars, and seal.

JAMRUL & GOLAB-JAM PRESERVES.

Take a seer of jamrul or golab-jam and wash with water to remove dust and dirt from their surface. Prick the fruits with a little pointed bamboo strip to allow the syrup to get inside the material. Now take $1\frac{1}{4}$ seer of sugar and one seer of water in an enamelled vessel and put into it the fruits. Boil until the material becomes a heavy preserve.

TOMATO PRESERVES.

To make a good preserve of this stuff, take a measured quantity of ripe tomato. Wash well and put in a capacious enamelled vessel. Now to each seer of tomato taken add an equal amount of sugar, and about $\frac{3}{4}$ seer of water. Boil down to a heavy preserve, and put in jars while still hot. If you desire to impart good flavour you may use spices before the tomatoes are boiled.

PEAR PRESERVES.

Take firm, sound, not overripe pears, and an equal weight of loaf sugar. Pare, halve and core the pears. Put half the sugar into a preserving pan, to each pound add 2 pt. of water, and boil to a thin syrup. Let it cool, put in the prepared fruit, and simmer very gently until half cooked. Turn the whole into an earthenware bowl, cover, and allow them to remain

for 8 days. When ready, drain the syrup into a preserving pan, add the remainder of the sugar and a tablespoonful of lemon juice to each pint of liquid, and boil gently for 15 minutes, skimming well meanwhile. Now put in the fruit, simmer very gently until quite tender, then transfer them carefully to jars, and pour over the syrup. Cover closely and store in a cool, dry place. Requires altogether 2 days.

FIGS PRESERVES.

Take green figs. To each pound allow 1 lb. of sugar, and $\frac{1}{2}$ pt. of brine that will float an egg. Make a slit across the top of each fig, cover them with brine, and let them remain for 8 days. Drain well, boil gently in a little water until quite tender, then drain again, and cover with cold water. Change the water daily for 3 days, and on the third day have ready a syrup made of the sugar and water in the proportions given above. Boil the figs in the syrup for 10 minutes, repeat the process daily for 3 or 4 days, until the figs are tender and green. Place them in jars or bottles, add the syrup cover closely, and store in a dry, cool place.

GREEN GINGER PRESERVES.

Put the green ginger regularly, every night and morning for a fortnight, into fresh boiling water. Remove the outside skin with a sharp knife, boil it in water until it is quite soft, and slice it in thin slices. Make ready a syrup of 1 lb. of loaf sugar to $\frac{1}{2}$ pt. of water, clarify it, and put the ginger into it. Boil until it is clear. It requires 14 days.

JAM MAKING.

A jam is a preparation consisting of whole fruit boiled with sugar, and hav-

ing a consistency firm enough to meet the demands of confectioners, and to withstand the accidents of transport without altering its position in the container. In other words, jam consists of fruit tissues embedded in a reasonably firm pectin-sugar-acid gel. The only difference between a jam, and a fruit jelly is that in the latter the pectin is extracted from the fruit tissues by boiling with water, the extract being separated from all solid materials by pressing in hydraulic presses and filtering either through flannel or iron-free kieselguhr. It is then mixed with sugar, and made into a clear gel.

In principle, therefore, jams and jellies are the same, and apart from questions of flavour and colour, their method of manufacture turns on the properties of pectin, and the laws governing the formation of the pectin-sugar-acid gel.

For jam making it may be suggested that the quantity of fruit (40-60 lbs.) sufficient for one boiling of jam should be mixed with 20-30 lbs. of sugar in permanent containers of aluminium of suitable shape for handling and stacking.

JAM BOILING.

In all jam boiling the immediate indicators of the end-point are a thermometer of special pattern, and a long-handled, flat spoon or "skimmer" made of silver, copper or aluminium. When the thermometer has risen to about 218-220°F, the jam boiler begins to test for jellying properties by dipping the skimmer into the boiling mass, and observing the manner in which the jam or jelly falls from the edge. At first it merely runs off in a stream, showing

that the end-point has not been reached. Later, however, it begins to thicken, and finally it shows a tendency to gel by "flaking off" or breaking off clean. This usually occurs somewhere between 220° and 223°F, according to the barometric pressure and the nature of the product which is being boiled, and some experience is required in judging the exact moment for cutting off the steam, and emptying the pan so as to obtain the optimum gel. The whole process should not occupy more than 10 minutes.

With experience, one or two trial boils will usually suffice but the thermometer and "skimmer" should be used continually throughout, and the jam should be tested at frequent interval in order that any variation in the materials, negligence on the part of the jam boiler, or other sources of trouble, may be detected and amended. The boiling is carried out in jacketed pans heated by steam under a pressure of 60-80 lbs. These pans are usually made of copper, in which case it is good practice to have them heavily silvered inside; nickel, aluminium and stainless steel pans are also used.

Since prolonged heating tends to destroy the setting power of the pectin, it is necessary to adjust the recipe, and the steam pressure in accordance with this principle. The material is caused to boil as rapidly as possible, frothing being prevented by the addition of a little butter or other oil, and the water to be evaporated is cut down to a minimum. It is a good practice, especially if the boils are large, or if syrup is used instead of sugar, to add the pectin in concentrated form.

Generally speaking, boiling need not be prolonged more than is actually necessary to cook and sterilise the fruit, to liberate the pectin, to ensure the thorough mixing and dissolution of the soluble ingredients, and to bring about the necessary degree of inversion of the sugar. The latter is a function of duration of boiling, and acidity; if too low, it may be corrected by the addition of citric or tartaric acid. As soon as the boiling is complete, the steam is cut off from the pan, and the jam or jelly is emptied by tilting into a water-cooled trough, where it is stirred gently until the solids no longer float. It is then filled into jars either mechanically or by hand, the surface is covered with a thin disc of waxed tissue paper, and the jam is allowed to cool. If the output is large, it will be necessary to cool the filled jars artificially in a cooling tunnel or chamber through which air is drawn by fans. When cool, the jars pass into the stores, where they are stocked.

A summary of the method of jam making is given below:—

Wash the fruits and peel them. Then weigh and cut them in pieces, if necessary. Cook with a little water until they are soft. After this mash with a mallet or spoon and strain in a bamboo strainer. Now add an equal quantity of sugar to fruits and cook for 5 to 10 minutes. Pour in hot bottles or glasses and cover with melted paraffin wax when cold. Lastly put on label and store in a dry cool place.

BLACKBERRY JAM.

Use 60 lbs. of blackberries, 100 lbs. of sugar, and 4 gallons of water. Cook the blackberries in the water 10 to 15

minutes, then add the sugar and cook to 220°F. Process for 25 minutes at 180°F. Do not attempt to cook blackberries in syrup. In this case they will be coated with the syrup and become very hard.

APPLE JAM.

I.

To each pound of fruit, weighed after being pared, cored and sliced, allow $\frac{3}{4}$ lb. of preserving sugar, the finely grated rind of 1 lemon and the juice of $\frac{1}{2}$ lemon. Choose firm, sound apples of the same kind; peel, core, and cut them into thick slices. Barely cover the bottom of a large stewjar with cold water, add a good layer of sliced apples, cover thickly with sugar, and sprinkle with lemon rind and lemon juice. Repeat until all the materials are used, cover the jar closely, place it on the stove, or in a moderate oven, in a tin half full of boiling water, and stew gently until the apples are tender. If the preparation appears rather dry it may at once be put into the pots; if not, the lid must be removed, the stewjar taken out of the water and placed on the stove, and the contents boiled and stirred until the greater part of the moisture has evaporated. It requires from $2\frac{1}{2}$ to 3 hours,

II.

Use tart apples. Peel and quarter the apples, blanch them in boiling water for 2 minutes. Use 50 lbs. of apples, 50 lbs. of sugar, 3 gallons of apple juice, $\frac{1}{2}$ oz. of crushed (not ground) ginger root. Cook the syrup to 215°F, add the apples and cook to 218°F. Process for 25 minutes at 170°F,

MANGO JAM.

Select fleshy half-ripe mangoes, peel and slice and to every pound of fruit add

one pound of refined sugar. Moisten the sugar with a little water, set up to boil and when the sugar has dissolved add the sliced fruit and cook till the syrup thickens and the fruit is quite tender and broken. When nearly cold, the finished jam is put in wide mouthed glass bottles, which in the meantime have been sterilized by placing them in boiling water.

RED CURRANT JAM.

Take red currants. Remove the stalks, put the fruit into a preserving pan, and to each pound allow $\frac{3}{4}$ lb. of preserving sugar. Stir occasionally until the fruit is nearly boiling, and afterward almost continuously. Boil gently for about 40 minutes, or until a little will set when poured on to a cold plate. Turn into pots, cover closely, and store in a cool, dry place. It requires about 1 hour.

JELLY MAKING.

It is a well known fact that most fruits contain more or less acid, but pectin does not exist in some fruits in sufficient quantity to make a jelly. Pear and guava contain a good deal of pectin but are lacking in acid, while cherry, peach, etc contain acid but are deficient in pectin. Orange and apple contain both acid and pectin which make an ideal, pure jelly. Those fruits which lack either acid or pectin may be mixed with other fruits, so as to make a mixed jelly by supplying the necessary ingredients either acid or pectin, to a fruit juice intended for jelly making.

PRESSING OUT THE JUICE.

The fruits should be washed thoroughly just before the juice is pressed out of them. Special care must be taken in the washing of small fruit.

Crush or cut the fruits and weigh them. If the fruits are soft and juicy it is not required to add water but if they are tough, and dry enough, sufficient water should be added to cover them in the boiler.

The pectin is held in the tissues of plants. It comes out with the juice when the crushed material is boiled. Small fruits like the grapes and berries do not require any water when boiled. Care must be taken not to add too much water as it will dilute the juice, resulting in complete failure.

The crushed fruits are boiled with water until they become tender. Generally soft fruits require a short, and tough fruits a long boiling. For example, ten to fifteen minutes are quite sufficient for mangoes and apples, whereas about one hour is required for oranges and lemons. The fruit should not be boiled longer than what is actually necessary, as it develops a very disagreeable taste on prolonged cooking.

When the fruit becomes tender, the liquid may be squeezed by a piece of thin cloth which gives a clear juice. But to get the greater portion of juice and pectin, it is better to press out the juice from the cut fruits by a hand press and then use a bag filter to clear the juice from pulps. This will produce more transparent juice.

TEST FOR PECTIN.

In jelly making this test is indispensable and can be determined by a simple manner as follows:—

Take in a test-tube a teaspoonful of juice and add to it an equal quantity of denatured alcohol and stir slowly. If there is sufficient amount of pectin in the

juice, a glutinous mass will be formed in the tube; but on the other hand if the juice is deficient in pectin, it will give a few small flaky pieces of sediment. If any one tries to make jelly with the latter, he will be unsuccessful. Hence this test should first be carried out before going to make jelly.

TEST FOR ACID.

As already mentioned that some fruits do not contain enough acid to make a good jelly, and the sugar will crystallise after a time. In order to test the acidity of a fruit juice, the following simple test may be made:—

Take a ripe lemon and squeeze the juice out. Now take a teaspoonful of this juice in a test-tube and dilute it 10 times with water and add one-half teaspoonful of sugar. Stir well. Compare the acidity of this sample with that of the juice intended for jelly making by taste. If the former does not contain as much as that of the dilute lemon juice, it is deficient in acid and in that case some lemon juice or acid from other sources may be added so as to be successful in jelly-making.

ADDITION OF SUGAR.

The quantity of sugar to be added to the juice depends on the pectin and acid content of the juice. When the juice contains sufficient pectin, and acid, it will require to have added 1 to 1½ times the amount of sugar, but when the juice contains less pectin but excessive acid, it will require about an equal amount of sugar. In other words, a juice deficient in pectin will require a less amount of sugar, because the pectin concentrates due to the evaporation of water by boiling. Boiling must be

continued until the liquid contains 60 per cent. sugar. At that concentration of sugar, with enough pectin and acid, a first-class jelly will form possessing good keeping power.

The material should be boiled in a shallow enamelled or earthenware vessel on a good flame as rapidly as possible. Cooking the juice for a long time will tend to darken the finished product, therefore lowering the quality. The juice should be boiled down until it will fall from the spoon to a jelly when cold. When there is sufficient pectin it will fall to a jelly when the liquid concentrates to 60 per cent. sugar as already stated.

The finishing stage may be determined by allowing the jelly to drip from the stirring spoon. When it is noticed that the liquid drips from the spoon in flakes or sheets, it is considered to be finished. The jelling point may be determined by dipping a thermometer in the boiling liquid. When the temperature comes up to 223°F, it is sure that the liquid has come to the jelling point. If the boiling liquid is removed from the fire at a less temperature, it will not form a jelly but will form a sumpy liquid. As soon as this stage has been arrived, the vessel should be removed from the fire and skimmed, then the jelly should be poured into containers, and set aside to cool. When quite cold a piece of parchment paper is put on the top of the jelly before the cork of stopper is put on.

If the jelly contains 65 per cent syrup it will not mould, but when the percentage of sugar is less it will. For this reason it is better to sterilise the containers after they are filled up. Glass

jars should be immersed hot in a pan containing hot water and sterilized for 10 minutes with the cover on. Tin cans should be sterilized after they are capped and sealed, for 10 minutes in boiling water. Such jellies are well suited for market purposes and keep very well for a long time. If desired, the juice for jelly-making may be bottled and sterilized to be used later when time and opportunity permits of the operation.

GUAVA JELLY.

Boil the fruits and press out the juice. Determine the quantity of sugar to be added by the use of the alcohol test given above. Then bring the juice to boil and add the calculated amount of sugar. Cook rapidly until the jelling point is reached. Next remove from the fire, skim, and pour into hot glasses, which have been boiled previously. Finally, cover the jelly when cold with melted paraffin and label and store away in a cool place.

Apples, karamcha, blackberry, etc., may be made in the same way.

BANANA JELLY.

Peel the ripe fruits, cut them into slices, add 1 lb. of water to each pound of slices and boil for about 1 hour, until the mixture is soft enough to be strained through calico. After straining add 1 lb. of sugar and sufficient citric or tartaric acid, or simply lime juice, to give the mixture an agreeable taste. If citric acid or tartaric acid is used it should be dissolved in water before it is added to the fruit pulp. The boiling should then be repeated for at least another hour. Finally the jelly is bottled up when fairly hot, the bottles used being fumigated inside with a taper of burning sulphur.

introduced immediately before the warm jelly is put in. A piece of parchment paper is put on the top of the jelly before the cork or stopper is put on, after the jelly has become quite cool.

APPLE JELLY.

Apples, 10 lbs.; water, 10 pt.; to each pint of liquid obtained from these allow 1 lb. of sugar and the juice of 2 lemons. Rub the apples well with a dry cloth, but do not pare them. Cut them into quarters, remove the cores, and put them into a preserving pan with the sugar. Simmer until perfectly soft, but not broken, then strain off the liquid without squeezing the pulp. If not clear, pass through a jelly bag or clean dry cloth until it becomes so. Add sugar and lemon juice in the proportion stated above, and simmer gently until a little poured on a cold plate, almost immediately begins to stiffen. Pour into pots or glasses, cover closely, and store in a cool, dry place. It requires from 25 to 30 minutes, after straining. The apple pulp may be sweetened, flavoured with ginger or cinnamon, and made into jelly.

CURRANT JELLY.

The simplest method of making currant jelly is perhaps the following: Free the currants from leaves and large stems, put them in the preserving kettle, crush a few with a wooden vegetable masher or spoon, and heat slowly, stirring frequently. When the currants are hot, crush them with the vegetable masher. Put a hair sieve or strainer over a large bowl; over this spread a double square of cheese cloth. Turn the crushed fruit and juice into the cheese cloth and let drain as long as it drips, but do not

use pressure. To hasten the process take the corners of the straining cloth firmly in the hands and lift from the sieve; move the contents by raising one side of the cloth and then the other. After this put the cloth over another bowl, twist the ends together, and press out as much juice as possible. This juice may be used to make a second quality of jelly. The clear juice may be made into jelly at once, or it may be strained through a flannel bag. In any case, the method of making the jelly is the same. Measure the juice, and put it in a clean preserving kettle. For every pint of juice add 1 pt. of granulated sugar. Stir until the sugar is dissolved; then place over the fire; watch closely, and when it boils up draw it back and skim; put over the fire again, and boil and skim once more; boil and skim a third time, then pour into hot glasses taken from the pan of water on the stove, and set on a board. Place the board near a sunny window in a room where there is no dust. It is a great protection and advantage to have sheets of glass to lay on top of the tumblers. As soon as the jelly is set cover by one of the three methods given.

II.

Use 5 gallons of currant juice, 30 pounds of granulated sugar. Put the currant juice and sugar in a kettle, and cook to 28°Be, if the jelly is made from fresh juice. If made from jug juice early in the season, cook to 30°Be, and if made from old jug juice, it may be necessary to cook to 32°Be.

"Be" is meant for the degree indicated in Beaume saccharometer.

BLACKBERRY JELLY.

Use 5 gallons of blackberry juice, 25 lbs., of granulated sugar. Cook to 34°Be.

GRAPE JELLY.

Prepare grape jelly in the same way as currant. Cook to 32°Be. Do not use over-ripe grapes for making jelly juice.

DRYING OF FRUITS.

The preservation of fruits by drying involves the reduction of their water content to a point at which the concentration of the soluble solids (sugar, acids, salts, etc.) has become so high that the material no longer constitutes a suitable substratum for the growth of moulds, yeasts and bacteria. It has the advantage over other methods of preservation of reducing the bulk and weight of the product, thereby reducing storage and transport charges. A large number of fruits may be dried for market and home use. Among the fruits, plums, grapes, mangoes, peaches, apples, pears, kamranga, amlaki, etc., are important marketable products.

METHODS OF DRYING.

Fruits may be dried either in the sun or by artificial heat in the form of a stove. But in such hot country like ours with so many sunny days, it is easy to dry such products in the sun. It is for this reason we have dispensed with the latter process, and only have dealt with the former.

PREPARATION FOR SUN DRYING.

In drying fruits, they should be washed, peeled, cut and sliced; while small fruits may be dried whole. In drying some fruits, such as grapes, plums, peaches, etc. they are generally dipped

in 1½ per cent hot lye and washed, so as to drive the waxy material out.

LYE.

The lye solution is made by dissolving ordinary high grade caustic soda or caustic potash in water. The strength at which it is used varies from a pound in 10 or 12 gallons of water to a pound in 25 or 30 gallons of water, depending upon the variety, the temperature at which the solution is maintained, the length of time the fruit is immersed in, etc.

SUN DRYING FRUITS.

Before the fruits are exposed to the sun they are treated to the fumes of burning sulphur in order to prevent its turning dark while drying, as well as for certain other effects. For this purpose the fruits are placed on trays stacked on double trucks in a special air tight chamber furnished with iron pipes for the entrance and exit of sulphur fumes. From 18 to 25 trays are commonly put in a stack, with the end of each tray overlapping 3 or 4 inches, alternately, the one below, in order to provide free circulation of fumes between the trays,

DETAILS.

It should be observed that many of the details of the drying of fruit in the sun can be acquired only by actual experience. The making of high grade product, however, depends upon the attention paid by the preserver.

Most of the operations will be considered under the different fruits, but the use of the sulphuring house as mentioned above is the same for all fruits that are treated to the fumes of burning sulphur. The details vary only as the needs of different fruits may require.

However, there is no uniformity of opinion or practice among the operators as to what treatment gives the best results with different fruits. Details differ widely, especially as concerns the amount of sulphur used per given unit of space and the length of time the fruit is subjected to the sulphur fumes. Moreover, there is a difference in varieties, as well as in the degree of maturity of the fruit in the way in which it takes the sulphur fumes. It is therefore necessary to treat some lots of fruit longer than others to accomplish the desired results.

The fruit is treated with fumes of burning sulphur for various reasons. It prevents the fruit turning into a dark, unattractive colour while drying; it appears to have a definite influence on the readiness with which the fruit parts with its moisture content, sulphured fruit dries much more quickly and with a better texture than unsulphured fruit; with some fruits it is said to prevent souring in the early stages of drying; it also doubtless gives a certain amount of protection against insect injury while the fruit is exposed to dry.

After sulphuring the fruits are exposed to the sun to dry. If showers occur while the fruit is exposed in the drying yard, it is of the greatest importance to protect the fruit against getting wet. If by chance the fruit becomes wet, while it is drying, it never finishes into a high-grade product as it otherwise would.

The fruit in all cases should be fully ripe, but not mushy. The condition commonly termed "eating ripe" indicates a suitable degree of maturity. If over-

ripe, the individual pieces will not retain their shape; if underripe, the dried product will be poor in flavour, appearance, and texture. Moreover, a dried product of high commercial grade cannot be made from culled fruit. While such fruit may produce a perfectly wholesome product when dried, and its use in this way may often provide a satisfactory means of disposing of fruit that cannot be marketed well in the fresh state, the producer should not expect to receive as high prices for it as for the product of the best grades of fresh fruit.

PICKLES & CHUTNEYS.

When fruits are preserved in brine or vinegar they are usually called pickles, whereas chutney is a preparation of fruits which are boiled in sugar, salt, vinegar and other materials to a thick consistency.

In the summer season these products are in great demand in the market and are sold at a rather higher price. By proper handling one can improve the same in a profitable basis as a small scale industrial product.

The fruits are sometimes pickled whole and sometimes in pieces. These are sometimes treated in lime water or whey for the purpose of the growth of acidic fermentation, which retards future decomposition and decay. It is believed that the pickles are improved in texture by this treatment. The pieces are then besmeared with salt which as remarked before draws out water from within and are allowed to remain exposed to bright sunshine, when the water dries up. The chemical process involved in the treatment is hard to explain but it is believed that the salt prevents injurious bacteria

from active growth, and as a result of complicated chemical changes, sugar of the fruits and vegetables is converted into lactic acid, which turns the grass greenness of the fruits such as mangoes to an olive green, which colour is recognised to be the correct tint of pickles. When the salt is acidic, all air should be excluded as otherwise a formation of yeast scum spoils the pickles. At this stage, that is when the salt is acidic the salted eatables are covered with vinegar or mustard oil. It is said that the great secret of pickle making lies in bringing about acid fermentation quickly and, when this is done, in preserving the acidity by covering tightly.

The pickle is, however, to be put in the sun for several days before it is ready for use. Even then the containing jars should be sunned from time to time to render the formation of moulds impossible, the fermentative bacteria being destroyed by the sun.

PACKING FOR EXPORTING

Pickles are now a days exported to foreign countries amounting to several lakhs of rupees. In order that they may reach the destination in good condition they should be put in wooden casks of suitable sizes. This will not only keep the material in good order but also prevent waste by breakage.

A few typical recipes follow:—

MANGO PICKLE.

(SWEET). I.

Mango (Green)	20
Mustard Rye	1 ch.
Black Pepper	2 tollahs.
Fenugreek	2 „
Cumin Seed, White	2 „
„ Black	1 tollah.
Turmeric	1 „

Salt 3 tollahs.

Vinegar of Mustard Oil 8 ch.

Cut the mangoes lengthwise into 2 or 4 slices. Then besmear them with salt and mustard rye brayed into paste. Keep for a couple of days when watery juice will come out of them. Now take off the slices, clean them and soak in a thick sugar syrup 1 seer for 24 hours. Finally put in a jar and pour mustard oil or vinegar over it. Use after a few days.

MANGO (HOT).

Mango (Green)	20
Mustard Rye	2 ch.
Chilli	q.s.
Turmeric	1 tollah.
Salt	4 ch

Peel and core green mangoes and cut into slices. Now bruise them well and mix with salt. Keep aside for one day. Water will come out from the mangoes. Now drain off the water. Now add brayed mustard seed, chilli, turmeric and salt in proportions given or as desired. The preparation keeps for two to three months.

JACK FRUIT.

Jack Fruit (Green)	1 seer
Rock Salt	1 ch.
Mustard Seed	1 ch.
Chilli	1 ch
Aniseed	$\frac{1}{2}$ ch.
Cumin Seed	1 ch
Turmeric	1 tollah
Mustard Oil	q s

Take a green jack fruit. Remove the skin and reject the unnecessary parts. Then cut the fruit into slices and steep in cold water for 10 minutes. Now take them out and have them boiled in water till soft. Allow to drip and put in the sun for about 2 hours. Then mix

salt and set aside for 2 or 3 days. When no more water comes out, mix the spices in powder form and put in the sun for 2 days. Then put in a jar and cover up with oil. Put in the sun for 10 to 12 days.

PINEAPPLE.

Pineapple	1 seer.
Superfluous Lemon	10 seers.
Salt	2 ch.
Sugar	4 ch.
Vinegar.	1 seer.

The pineapples are carefully peeled and the eyes are all taken out. Salt and sugar are then added to it. The whole is then allowed to remain exposed to sunshine for 3 days and is put in a wide-mouthed vessel. Finally cover up with approximately one seer of the best vinegar. The jar should be sunned for a month before the pickle is ready for use.

ORANGE.

Orange	25
Curd	8 ch.
Lemon	100
Salt	4 ch.

The oranges are first of all scraped with a piece of jhama (over-burnt brick) only slightly. Care should be exercised while scraping, for if done in excess this is responsible for bitterness of taste. The oranges are then dipped in sour curd and salt and after taking out put in the sun in a stone tray. After three days bottle up in a wide-mouthed vessel and pour over them the juice of 100 lemons. Keep out in the sun and dew alike for a month before use.

DATES.

Dry Dates	1 seer.
Ginger	4 ch.

Salt	2 ch.
Vinegar.	4 seers.

Clean the ginger and cut into slender pieces. Cut the dry dates longitudinally into four pieces and throw off the stones. Now put the vinegar in a pan over a slow fire and when boiling throw in the dry dates and the other ingredients. Continue heating and remove when one seer of vinegar is left.

RAISINS.

Raisins	1 seer.
Black Pepper	1 ch.
Cumin Seed, Black	$\frac{1}{2}$ ch.
" White	$\frac{1}{2}$ ch.
Rock Salt	3 ch.
Cardamom Major	$\frac{1}{2}$ ch.
Ginger	4 ch.
Grape Vinegar	1 seer.

First put the vinegar in a pan on fire and when boiling briskly add the salt, bruised ginger and cleaned raisins. Continue boiling and when the mass thickens, incorporate the other ingredients of which cardamom major should be powdered and others remain whole. Continue heating gently for some time more and remove, when it is ready for use.

CUCUMBERS, PICKLED.

Take some Cucumbers; and cover them with good vinegar. To each pint of vinegar allow $\frac{1}{2}$ oz. of peppercorns, $\frac{1}{2}$ oz. of allspice, $\frac{1}{2}$ teaspoonful of salt. Peel the cucumbers, cut them into $\frac{1}{2}$ in. slices, sprinkle them liberally with salt, and let them remain until the following day. Let the cucumbers drain for at least 2 hours on a hair sieve, then place in wide-necked glass bottles. Boil the vinegar, salt, peppercorns and spice together, pour it,

while hot, over the cucumbers, and cover closely. If stored in a cool, dry place, this pickle will keep good for some time; but as it is liable to become mouldy, the bottles should be frequently examined. When the first speck of mould appears reboil the vinegar, immerse the slices of cucumber in it for 1 minute, then put them into a clean, dry bottle, and pour the boiling vinegar over them. It requires 2 days.

LEMON PICKLE.

Lemons, 12; baysalt, 1 lb.; mustard seed, tied in muslin, 4 oz.; peeled garlic, 2 oz.; grated nutmeg, $\frac{1}{2}$ oz.; ground mace, $\frac{1}{2}$ oz.; ground cloves, $\frac{1}{4}$ oz.; white-wine vinegar, 1 qt. Remove the rinds of the lemons in thin slices, and put them aside, to be afterward dried and used for flavouring purposes. Leave all the pith on the lemons, cut them lengthwise and across, thus forming four quarters, sprinkle over them the salt, and place them singly on a large dish. Let the dish remain near the fire until all the juice of the lemons has dried into the pith, then put them into a large jar. Add the rest of the ingredients, cover closely, and let it stand near the fire, but not on the stove, for 5 days. At the end of the time cover the lid with parchment paper or bladder, and put the jar in a cool, dry place. At the end of 3 months strain off the vinegar through a hair sieve and press the fruit well to extract as much moisture as possible. Strain 2 or 3 times, and when quite clear bottle for use.

LIMES, PICKLED.

Limes, 25; salt, 4 oz.; green chillies, 4 oz.; green ginger, 4 oz.; mustard seed freed from husks, 2 oz.; ground tur-

meric, 1 oz.; good vinegar, $1\frac{1}{2}$ pt. Cut the limes across in halves, squeeze out all the juice, add 2 oz. of salt, and cover closely. Sprinkle the remaining salt over the rinds, let them remain for 6 hours, then dry them in the sun for 3 days, or until hard. Boil the chillies, green ginger, mustard seed and turmeric in the vinegar for 20 minutes. Let the preparation cool, mix it with the lime juice, and strain it over the lime rinds, previously laid compactly in wide-necked bottles or jars. Cover closely, place them in the sun for 3 or 4 days, then store for use. It requires 5 days.

MIXED PICKLES.

To each gallon of vinegar allow $\frac{1}{4}$ lb. of bruised ginger, $\frac{1}{4}$ lb. of mustard, $\frac{1}{4}$ lb. of salt, 2 oz. of mustard seed, $1\frac{1}{2}$ oz. of turmeric, 1 oz. of ground black pepper, $\frac{1}{4}$ oz. of cayenne, cauliflowers, onions, celery, gherkins, French beans, nasturtiums, capsicums. Have a large jar, with a tight-fitting lid, in which put as much vinegar as required, reserving a little to mix the various powders to a smooth paste. Put into a basin the mustard, turmeric, pepper and cayenne; mix them with vinegar, and stir well until no lumps remain; add all the ingredients to the vinegar, and mix well. Keep this liquor in a warm place, and thoroughly stir it every morning for 1 month, with a wooden spoon, when it will be ready for the different vegetables to be added to it. As these come in season, have them gathered on a dry day, and after merely wiping them with a cloth to free them from moisture, put them into the pickle. The cauliflowers must be divided into small bunches. Put all these into the pickle raw, and at the

end of the season, when as many of the vegetables as could be procured have been added, store the pickle away in jars, and tie over with bladder. This old-fashioned method of preserving vegetables is largely employed by those who live in the country. The pickle should be kept for at least 3 months in a cool, dry place before being used.

TOMATOES AND ONIONS, PICKLED.

Take an equal weight of firm tomatoes and medium-sized Spanish onions; and vinegar to cover. To each pint of vinegar allow 1 teaspoonful of peppercorns, $\frac{1}{2}$ teaspoonful of allspice and peppercorns, tied together in muslin; cover with vinegar, and simmer very gently for 5 or 6 hours. Turn into wide-necked bottles or jars; when cold, cover closely, and store in a cool, dry place.

PEARS, SWEET PICKLED.

Choose firm pears. To each allow $\frac{1}{2}$ lb. of brown sugar and $\frac{1}{4}$ pt. of malt vinegar; cloves, cinnamon, allspice 1 oz. each or q.s. Peel the pears, and tie the spices in muslin. Place the vinegar, sugar and spices in a preserving pan; when boiling, add the pears, and cook them gently until tender. Remove the pears to a bowl or large basin, boil the syrup for 10 minutes longer, then pour it over the fruit. On the following day boil up the syrup, and repeat the process the two following days. On the third day place the pears in jars or wide-necked bottles, and remove the spices before adding the vinegar to the fruit. Store in a dry, cool place. It requires 3 days.

CHUTNEY INDIANS.

Malt vinegar, 1 qt.; sour apples, peeled, cored and sliced, 1 lb.; onions,

peeled and coarsely chopped $\frac{1}{2}$ lb.; moist sugar, 1 lb.; raisins, stoned and quartered, $\frac{1}{2}$ lb.; salt, 4 oz.; ground ginger, 4 oz.; dry mustard, 2 oz.; cayenne, $\frac{1}{4}$ oz.; 4 cells of garlic finely chopped. Cook the apples, onions and garlic with the salt, sugar and vinegar until quite soft, and pass them through a fine hair sieve. Add the raisins, ginger, cayenne and mustard, mix well together, turn into a jar, and stand it in a warm, but not hot place, until the following day. Have ready some perfectly dry, wide-necked small bottles or jars, fill them with chutney, and cover closely so as to exclude the air. This chutney may be kept for a year or two.

CHUTNEY MANGO

Green mangoes, 50; vinegar, 6 pt.; sugar, 3 lb.; tamarinds, stoned, 2 lb.; raisins, stoned, 1 lb.; green ginger, sliced 1 lb.; powdered cinnamon, 1 good teaspoonful; nutmeg, 1 level teaspoonful; salt, 1 lb. Peel and slice the mangoes thinly, sprinkle over them the salt, let them remain for 36 hours, then drain well. Make a syrup by boiling together 3 pt. of vinegar and the sugar. Put the remainder of the vinegar into a preserving pan, add the mangoes, boil up, simmer gently for 10 minutes, then add the tamarinds, raisins, ginger, cinnamon and nutmeg. Cook very slowly for $\frac{1}{2}$ hour, adding the syrup gradually during the last 10 minutes. Stir and boil the mixture until the greater part of the syrup is absorbed then turn into bottles, cork securely, and store in a dry place. It requires about 14 hours to cook.

MARMALADE MAKING

Marmalades when well made always show a jelly-like appearance. These are

generally made from oranges. The principle is just the same as in jelly making—except that the rind is used in it more or less because the pectin that causes the jelling effect in the marmalade is present in the white inner skin of oranges. The acidity of marmalades should by no means be less than 5 per cent.

PROCESS OF MARMALADE MAKING.

Wash the oranges in a basin of hot water and remove the peel and seeds, cutting one-half of the peel into very thin strips, and boil till they are very soft. (As all the rinds are not required, the balance may be boiled separately for an hour with a little water sufficient to cover them. The juice is then pressed out and kept in bottles so as to supply pectin whenever required). Now press out the juice from the rind as prepared above. But the usual course adopted by the manufacturers is to cut the oranges and boil with the rind and then press as in jelly making. Next add equal amount of sugar to the juice and also add the chips and boil rapidly until it reaches the jelling point.

If marmalade slicer is obtained, the fruits can be sliced with rind very thin and then boiled for an hour till the rind gets soft. Add sugar and follow the process as in jelly making. If oranges are not acid, lemon juice must be added to supply the required amount of acidity.

In making jams the whole or cut fruits may be used. This however depends on the size of fruits. These are boiled with sugar until crushed and form a uniform mixture throughout.

Most of the soft fruits, which are overripe, may be used to make good jams. Peaches, figs, mangoes, grapes, etc. are generally used for the purpose. If the amount of sugar in the jam is increased to 65 per cent or more, it will keep well without sterilization; but if the amount is not sufficient, the bottles or jars containing jam should be put in hot water bath for twenty or thirty minutes. When cold, tightly insert the stoppers into the mouth of the jar and cover with melted paraffin.

LEMON MARMALADE.

Place the lemons in a preserving pan, cover them with cold water, and boil them gently for 2 hours, during which time the water must be drained off and replaced by fresh boiling water at least 3 times. Let them cool slightly, slice thinly, remove all the pips, and weigh the fruit. To each pound allow 2 lbs. of loaf sugar and 1 pt. of the water the lemons which were last boiled in, and boil these together until a thin syrup is obtained. Then add the prepared fruit, and boil until the marmalade jellies when tested on a cold plate. Cover closely with paper brushed over on both sides with white of egg, and store in a cool, dry place. It requires from 3 to 3½ hours.

PINEAPPLE MARMALADE.

To each pound of pineapple pulp add 14 oz. of loaf sugar. Peel, core and slice the pineapples, and either pound or grate them finely, preferably the latter. Boil the pulp and sugar together until thick and clear, then turn into pots, cover first with brandied paper, and afterward with parchment. Store in a cool, dry place. It requires 2 to 3 hours.

APPLE MARMALADE.

Apples, 2 lb.; sugar, 4 oz.; butter, 1 oz. Peel, core and quarter the apples, place them in a jar with the sugar and butter, and stand the jar in a saucepan containing boiling water, or, when more convenient, in a cool oven. Cook until soft, pass through a fine sieve, and use for filling turnovers, or other kinds of pastry. It requires 1½ hours.

GRAPE MARMALADE.

Remove the stalks, put the fruit into a preserving pan, barely cover with boiling water, and simmer gently until perfectly soft, but the grapes must not be allowed to break. Drain well, pass through a fine sieve, and return the pulp to the pan. To each pint add from 12 to 16 oz. of sugar, according to the degree of sweetness required, and boil from 20 to 25 minutes, reckoning from the time the entire mass reaches boiling point. Turn into jars, cover at once with paper brushed over on both sides with white of egg, and store in a cool, dry place. It requires about 1 hour.

ESTIMATE FOR A MODERATE SIZE FACTORY.

The following appliances are indispensable for a fruit canning and preserving factory of a moderate size.

1. 16—H. P. Boiler, complete with all trimmings and including proper piping and fittings necessary for connecting Boiler with Tanks.

1 Scalding Tank, diameter 36 in., depth 24 in.

1 Exhaust Tank, diameter 36" X 24"

1 Process Tank, diameter 36" X 24"

4 Scalding Baskets.

2 Exhaust crates, 1 tier.

2 Process crates, 2 tier.

1 Perforated steam coil for Scalding Tank.

1 Perforated steam coil for Exhaust Tank.

1 Perforated steam coil for Process Tank.

1 Crane

1 30-gal. Gasoline Tank.

1 Air Pump for Gasoline Tank.

1 Air Bange for Gasoline Tank.

2 Gasoline Fire Pots.

1 Floor Truck.

4 Capping Steels,

4 Tipping Coppers.

1 Forging Stake.

1 Vise.

1 Thermometer.

1 Platform Scale.

2 Can Tongs.

1 Syrup Gauge.

1 Hammer.

25 Buckets.

6 Capping Trays 2 ft. X 2 ft.

3 Peeling Tables 3½ ft. X 8 ft.

1 Packing Table 3½ ft. X 8 ft.

1 Capping Table 3 ft. X 8 ft.

Estimated cost of this output delivered F. O. B. is Rs. 2500.

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bas.

Utilisation of Common Products.

RULES REGULATING THE PURCHASE OF STATIONERY STORES FOR THE PUBLIC SERVICE, 1935.

THE Government of India and the Provincial Governments purchase a huge amount of stationery and printing stores every year for the public service. In this connection they have formulated some rules and regulations which we publish here for convenience of our subscribers interested in the above trade.

The policy of the Government of India is to make their purchases of stationery and printing stores for the public service in such a way as to encourage the development of the industries of the country to the utmost possible extent consistent with economy and efficiency, and the following rules, which are applicable to the purchase of such stores for the Government of India and for provinces other than Governors' provinces, are prescribed in accordance with this policy. These rules supersede all previous orders on the subject and apply to the purchase of all the articles included in the appendix to these rules.

RULE 1.—PURCHASE IN INDIA.

Save as provided in rule 5 all stationery and printing stores required to be purchased for the public service shall be purchased on the condition that delivery shall be made in India for payment in rupees in India.

RULE 2.—TENDERS.

(a) Tenders shall be invited in India, and also abroad when considered desirable, unless the value of the order to be placed is small or sufficient reasons (which shall be recorded) exist for con-

cluding that it is not in the public interest to call for tenders.

(b) No tender which fails to comply with the condition as to delivery and payment prescribed in rule 1 shall be accepted.

(c) Tenders shall be opened after intimation to the tenderers and in the presence of those tenderers who desire to attend.

RULE 3.—PREFERENCES.

(a) Preference in making purchases will be given in the following order:—

First, to articles produced in India in the form of raw materials, or manufactured in India from raw materials produced in India, provided that the quality is sufficiently good for the purpose;

Secondly, to articles wholly or partially manufactured in India from imported materials provided that the quality is sufficiently good for the purpose;

Thirdly, to articles manufactured abroad and held in stock in India, provided that they are of suitable type and requisite quality;

Fourthly, to articles manufactured abroad which need to be specially imported.

(b) The Controller of Printing and Stationery, India, the Surveyor-General of India and the Master, Security Printing, India, may when they are satisfied that such a measure is justified, allow with the sanction of the Government of India a limited degree of preference in respect of price to articles produced or manufactured in India either wholly or in part.

RULE 4.—INSPECTIONS AND TESTS.

All articles shall be subject to inspection before acceptance, and articles

for which specifications and or tests have been prescribed shall be required to conform to such specifications and or to satisfy such tests.

RULE 5.—PURCHASE OF SPECIAL ARTICLES.

(a) When suitable and economical purchases of articles of a special or unusual character cannot be made in accordance with the preceding rules, the Controller of Printing and Stationery, India, the Surveyor General of India and the Master, Security Printing, India, may at their discretion obtain the article they require through the India Store Department, London;

(b) Where the value of the purchase so made exceeds Rs. 2000 the purchasing officer shall place or record his reasons for not effecting the purchase in accordance with rules 1 to 4.

RULE 6.—INTER-DEPARTMENTAL PURCHASES.

Nothing in these rules shall be deemed to prohibit the purchase of articles by one Department or Railway from another.

RULE 7.—POWERS OF PURCHASE.

(a) The Controller of Printing and Stationery, India, exercises full powers.

(b) In cases of emergency the Deputy Controller, Stationery, can purchase locally stationery and printing stores up to Rs. 10,000 in each case, subject to a report being made to the Controller of Printing and Stationery, India, if the value exceeds Rs. 250.

(c) Officers in charge of Government Printing Presses can purchase locally any article or any number of similar articles, purchased at one time, included in list C, up to Rs. 250, or with the sanction of the Controller of Print-

ing and Stationery, India, up to Rs. 1,000 in each case.

(d) The Surveyor General of India exercises full powers in respect of stores included in list C required for his map reproduction offices.

(e) The Master, Security Printing, India, exercises full powers in respect of stationery and printing stores, other than those intended for office use, required in connection with Security Printing.

(f) To meet urgent and unforeseen requirements Agents of State Railways can purchase locally stores included in list A up to Rs. 500 in each case, subject to a limit of Rs. 5,000 per annum, and any article or any number of similar articles purchased at one time, included in the lists B and C up to Rs. 1,000 in each case. They have power to delegate all or any of their powers to the Controller of Stores of the Railway or the officer in charge of the Railway Printing Press.

RULE 8.—PETTY PURCHASES.

(a) When it is inconvenient to obtain stores included in lists A and B through the agency of the Controller of Printing and Stationery, India, petty local purchases may be made without reference to the preceding rules by the authorities to whom this power has been delegated.

(b) Departments of the Government of India, minor local Governments, Heads of Departments, General Officers Commanding-in-Chief and General Officers Commanding Districts and Independent Brigades are empowered to sanction such purchases or delegate to officers subordinate to them to make such purchases up to Rs. 20 in each case

(Rs. 100 in each case for Heads of Branches of Army Head-quarters, General Officers Commanding-in-Chief Commands and Commander, Burma District only) subject to a limit of Rs. 250 per annum.

Provided that, except in the case of minor local Governments, these powers shall not be delegated without the sanction of and subject to such additional restrictions as may be imposed by the Government of India.

APPENDIX.

LIST A.—STATIONERY STORES.

Paper of all kinds, including printing, writing, drawing, blotting, cartridge, duplicating, typewriting, tracing, tissue, lithographic, packing, sectional, ferro-prussiate, carbon, oiled, waxed, stencil, litho transfer.

Boards, card, mill, paste, pulp or straw,

Parchment and vellum (imitation or real).

Binding materials, leather, imitation leather, cloth, buckram, gold leaf, needles, thread (linen, cotton or wire).

Writing and Drawing materials, including pencils, pens, pen-nibs, fountain and stylo pens, reeds, quills, ink, ink-powders, slate pencils, crayons, chalks, erasers (steel or rubber), ink-stands, ink-pots, rulers, paint brushes, water colours, colour boxes, saucers for colours, slabs, ruling paste, tracing cloth, ferro-gallic linen.

Envelopes of all descriptions.

Miscellaneous.—Books (blank, note, reporters, etc.), pads (writing or blot-

ting), tags, tape, twine, straps, sealing wax, glue, gum, paste, pins, pin-cushions, paper fasteners, paper cutters,

Packing cases and other packing materials (for Stationery Offices and Printing Presses only).

LIST B.—OFFICE MACHINERY AND APPLIANCES.

Typewriters and accessories, including ribbons.

Duplicators (flat and rotary) and office printing machines.

Calculating Machines.

Addressographs, protectographs and similar machines.

Numbering and dating machines.

Miscellaneous office requisites:—e.g., letter scales, punching and stapling tools, office cutlery.

Rubber stamps, metal seals, etc.

Card index systems and cabinets.

Loose leaf ledgers.

Machines, etc., required for testing paper and other stationery Stores.

LIST C.—PRINTING STORES.

Printing machinery of all descriptions including machines for composition, lithography, bindery, embossing, type casting, etc., etc., and accessories.

Printing furniture, including composing frames and cases, galleys, chases, quoins, riglets, leads, rules, etc., etc.

Type and type metal, and metal for conversion into type metal.

Ink, printing and lithographic.

Litho stones and plates.

Press and ruling machine blankets.

Glue, glucose, glycerine and other chemicals required for printing.

CLEARING OF IMPORTS.

WHEN an importer sends an order or indent to an exporter in a foreign country for certain goods which he requires, the latter can comply with the request on the 'cash with order' basis. But as the parties are usually well-known to each other, the exporter undertakes the risk of sending his goods in advance and receiving his payment afterwards. As he exports the goods he draws a bill of exchange on the importer and sends it to him through his bank. When the exporter hands over his packages to the shipping company, he receives a 'bill of lading' which is in fact an evidence of the contract entered into by the exporter and the ship-owner for the carriage of the goods. Of the many documents handled by the importer the most important one is the 'bill of lading.' It is the principal instrument for taking delivery of goods. The exporter does not send this bill of lading to the importer direct. He sends it after properly endorsing it to his bank with the invoice of goods for delivery to the importer. If it is a D/P (delivery after payment) business, the bank will demand of the importer full payment of the invoice value, before it will part with the documents. But when the business is on D/A (delivery on acceptance) terms, the importer has not to pay the value of the goods in advance. He merely accepts the bill of exchange drawn upon him and takes possession of the documents. The value of the invoice will be paid on the date stipulated in the bill accepted.

RECEIPT OF THE BILL OF LADING.

The B/L (Bill of Lading) generally reaches the importer earlier than the goods. Before the goods are shipped, the importer is informed through an "advice note" by the exporter that the goods have been despatched and that the shipping documents are being forwarded to him. When the B/L and other documents are received by mail by exporter's banker, an intimation is given forthwith to the importer. The importer accepts or returns the B/E (Bill of Exchange) to obtain possession of the shipping documents. He next endorses and sends the B/L to his representative or agent at the port of arrival with instruction to clear and forward the goods. The importer should very carefully examine the B/L, noting that an original (signed) copy has arrived and that the endorsements are in order and the marks and numbers, etc., agree with those advised. A careful perusal of the clauses and conditions of this document—particularly all clauses added in writing or anything noted by means of rubber stamps, etc.—may save subsequent troubles and expenses which usually follow from neglect in this matter. By the time a duplicate B/L arrives, many things may have happened to compromise the position. Hence the importance of prompt and careful inspection of documents.

FILLING UP THE BILL OF ENTRY.

A long process of work now follows before the importer or his agent can clear and take delivery of the goods at the port, say in Calcutta. "A Bill of

Entry for Consumption," usually called the "Bill of Entry" or the "Customs Challan" is the next document that is now of importance. All particulars of the goods imported (viz. marks, number of packages, total quantity, measurement, invoice value, etc.), must be entered in the Bill of Entry in duplicate. This is generally done by the Jetty Sarcar of the importer. The Bill of Entry in duplicate is the required form for payment of import duty and a set of two—one original and the other a duplicate—is obtainable from the stamp vendor at the Customs House. Unless the 'Customs Challan' has been delivered to the customs authorities and unless it has been signed by the Collector of Customs, no goods can be taken delivery of.

THE LINE & ROTATION NUMBERS.

There are series of customs formalities which the importer has strictly to observe henceforth. The importer after having duly endorsed the B/L must take it to the steamer agents for noting the 'Line Number' there on, if the same has not already been noted at the other end, i.e., the country of export. This 'line number' is required while noting the Bill of Entry (Customs Challan) at the Customs House. The 'Rotation Number' of the carrying vessel is also to be obtained from the 'Daily Entry of Steamers in Port' from foreign countries. After the 'line number' and the 'rotation number' of the vessel have been duly filled up in the Bill of Entry, the Jetty Sarcar files the Bill of Entry with the "Noter of the Import Department." The duty of this person is to record whether the goods concerned are mentioned in the "Import Manifest" or not. The

"Manifest" contains a list or invoice of all the goods on board the ship arriving at the port, which is lodged with the Customs House by Master or Agent of the vessel.

FROM THE 'NOTER' TO THE "PASS EXAMINER."

If the goods are dutiable, the Noter of the Import Department after examining the Manifest, marks the work "Noted" under his signature on the Bill of Entry and returns it to the Jetty Sarcar. If the goods are free, he instead of returning the bill to the Sarcar passes it on to the "Free Register Writer." This man enters the bill in the proper book, calls for the duplicate and passes it on the "Pass Examiner," who compares them and puts the stamp "Appraise and Pass" in black ink on the duplicate, which is then returned to the importer's Sarcar.

But when the goods are dutiable, certain other formalities have to be followed.

PROCEDURE WHEN THE GOODS ARE DUTIABLE.

When the Bill of Entry (Customs Challan) has been noted by the "Noter," it is taken along with the shipment sample and the relative invoice to the "Classifying Appraiser," whose duty is to assign the class of goods to their proper headings and see that the market value of the goods concerned has been correctly declared in the 'challan.' If the market price has not been declared correctly he returns the challan for rectification. Otherwise, he usually notes on the challan the rate of duty and issues order to the "Jetty Examining Officer" for opening the packages for appraisement. The jetty sarcar of the importer

now himself fills up the original "challan" with the amount of duty payable according to the rate noted by the appraiser. The challan is then taken to the "Calculator" who checks and notes on it the amount of duty to be paid by the importer. The challan is next forwarded to the "Accounts Department," where it is registered in the General Register of Receipts and where the A/C number is also noted thereon. The challan is countersigned by the Assistant Accountant-in-charge. The next step is to present the document to the "Cash Department" together with the Customs Receipts form, duly filled in by the jetty sarkar. This receipt can be obtained from the stamp vendors in the Customs House. The Assistant Cashier, usually called "the Poddar," now receives the amount of duty specified in the challan for the cashier and grants a Kuchcha receipt at the time of payment. The cash register clerk records the particulars of the challan in the Cash Register Book and puts the Cash No. in the challan. The Customs Receipt for the amount paid and the challan are returned to the sarkar, who now presents the original challan together with its duplicate to the 'Import Department' for entry. The documents are now again forwarded to the "Import Supervisor," who after examination passes them on to the "Pass Examiner." The Pass Examiner compares the documents and puts a red ink stamp "Appraise and Pass" on the duplicate.

CUSTOMS FORMALITIES END WITH THE "CUSTOMS PASS."

The documents are finally attested by the signature of the Assistant Collec-

tor and the duplicate copy only is now returned to the jetty sarkar. The duplicate challan is now termed "Customs Pass" or simply "Pass." The jetty sarkar now goes to the jetty where the goods are appraised and examined. The expression "Appraised in full" is endorsed on the "Pass" by the Appraiser which is then returned to the jetty sarkar. So far as the customs formalities are concerned, the process ends here, but before the delivery of cargo can be obtained, there are certain port formalities which are yet to be gone through.

HERE THE PORT FORMALITIES BEGIN.

The jetty sarkar has now to pay jetty and such other charges as river dues, differential toll, etc., payable to the Port Commissioners according to the scale of charges in force. For this he purchases from the stamp vendor an 'Import Delivery Challan,' usually called a 'Jetty Challan' which is to be filled up by the consignee or his agent. This challan, duly filled up will have to be filled with the 'Calculator' in the Jetty Office, together with the Customs Pass. The payment of the landing charges is now then made to the Cashier, who gives a Cash Receipt, along with the 'Jetty Challan' and 'Customs Pass.'

The next procedure in this long process of formalities is to file all the documents, viz., the Customs' Pass, the Jetty Challan, the Bill of Lading, and the Invoice, for registration with the "Foreman of the Shed," at which the ship has anchored. The Shed Foreman puts the landing date and the counter number A, B or C of the delivery section on the Jetty Challan, so that it may be forwarded to that particular section after

registration in the Import Original Manifest. The Foreman returns also the other documents, since these are required along with the Challan, by the Customs Appraiser and Examining Officer for opening and inspecting the cases or bales and comparing the contents with the invoice. As this examination is over, the Jetty Challan is stamped 'Passed out Customs Control in full'

THE 'DELIVERY ORDER' & THE "GATE PASS."

It is to be noted that the Delivery Order has not yet been secured. A Delivery Order form, which is obtainable from the respective foreman free, is at this stage to be filled up by the jetty sarcar. The Customs Pass and the Delivery Order are then presented to the Officer-in-charge of that delivery section who signs the Delivery Order and grants a 'Gate Pass.' The particulars entered in the Delivery Order and the Gate Pass are the consignee's name, Customs Pass number, and marks and numbers of the goods. The Gate Pass also contains the number of the gate through which the goods are to pass. When the goods are handed over to the importer's representative, generally the jetty sarcar, the Delivery Order has to be made over and an endorsement of receipt of the goods has to be made on the bill of lading which was presented to the Shed Officer along with the Customs Pass, Jetty Challan and invoice which were returned.

After securing the delivery of goods when these are loaded into carts, a 'Cart Ticket' is to be filled up and submitted to the Delivery Clerk for checking. The Gate Pass and the Cart Ticket are next made over to the Gate Officer, who

checks the Cart Ticket and the marks of the goods and then only, the carts are allowed to pass through the gate of the jetty.

PLANNING THE POSTER.

THE following points are to be taken into consideration in planning the poster.

1. A poster should be simple and bold in design.
2. Brief in text.
3. Understood at sight.
4. Pleasing and strong in colour.
5. Balanced in composition.
6. Designed to attract attention in some particular line.

Usually on a poster your elements will line up something like this—in the order of their attention value.

1. Name of product.
2. The picture.
3. The selling phrase.
4. The package.

As a rule human interest is predominant in posters. You can use no more words than you could in a thrifty telegram. You have to boil down your sale argument.

Advertisement by posters should deserve greater attention than hitherto paid to this subject. Outdoor advertising has its value, specially because there are many thousands who seldom read a piece of periodical literature of any kind and their minds are, therefore, keenly receptive to impressions created by outdoor advertising. Posters thus reach effectively and convincingly even the class of people that does not see advertising in newspapers or magazines.

IN THE INSURANCE FIELD.

BY OUR INSURANCE COMMISSIONER.

Salesmanship Again.

One of the persistent problems which face the production department of an insurance office is the question of training and educating the salesman. Quite a lot has been written on the subject, and instructions have been sought to be imparted on quite a large scale, but the problem remains far from being solved. It has come to be generally admitted now-a-days that knowledge should be put before personality as a qualification for successful salesmanship. The appreciation of the necessity for finding out certain general formulas for training the agents and underwriters in the art of salesmanship as a necessary preliminary to a bigger career in the line was manifest in a course of lectures organised by the Chartered Insurance Institute of London on this very subject. These lectures have supplied us with many useful suggestions which ought to be given careful consideration and the widest publicity. Mr. W. Penman, the chairman, sets forth in an admirable summing-up, the most important statement of ideals and suggestions from the speeches of the lecturers, as follows:—

1. Competition increases and conditions are difficult; prices are down and expenses up; yet progress is being made. Competition, in fact, helps business.

2. Naturally-inspired salesmen are few. Most of them have to achieve success by learning and using correct methods, by organising their activities to advantage, and by saying and doing the right thing.

3. Every "indore" man is a salesman for his Office. The way in which letters are answered, the way in which the telephone is attended to, and in which the messengers look after callers should all be part of the office salesmanship technique.

4. One of the duties (of the management) is instructing—another is heartening the staff.

5. A salesman can acquire good selling habits or bad selling habits.

6. Knowledge, honesty and hard-work are the three essentials to success.

7. Courage, knowledge and service. Courage to initiate knowledge to convince, and service to sustain—with perhaps a measure of pride of occupation.

8. Honesty in giving advice to agents and prospective policy holders is essential.

9. Avoid exaggeration. Be meticulously honest and sincere in any statements made. Cultivate enthusiasm and a sense of responsibility. You should be able to regard yourself as an advisor, almost as a professional man—not only a salesman.

10. It is not sufficient to know about the goods you sell. It is necessary also to be able to express yourself clearly about them and in a suitable form.

11. Things are brought, not for what they are, but for what they do. A man does not really buy a life policy—he buys the assurance that his dependents will have a sum of money when he dies, and he buys the quite legitimate sense of satisfaction which that feeling gives him.

12. A purchaser should get something of more service to him than the price paid. The seller is entitled to a fair profit. It is the salesman's duty to see that the business is such that his employer is involved in no special difficulty in handling it.

13. Good salesmanship is not selling a man something which he does not need—selling him too much is as bad as selling him too little.

14. Most people realise the need for insurance; the problem is to convert the vague recognition of need into definite action.

15. It is sometimes better to dwell on the income which the sum assured under a life policy will produce rather than on the actual amount of the sum assured.

16. It is not necessary to sell the cheapest goods. Don't make the mistake of under-estimating the amount of insurance a man is likely to want. He will appreciate the compliment if you are above rather than below his requirements.

17. Avoid comparisons if possible, but if comparison is necessary be fair. Never "throw mud" at a competitor—to do so is to do disservice to the whole business. "Go through life without ever ascribing to your competitors motives meaner than your own. Nothing so lowers the moral currency. Give it up and be great."

18. When possible, it is better to be particular than be general, e.g., it may be better to say "If you die this policy will secure your son's education" than to say "If you die the sum assured by this policy will be available as provision for your dependents."

19. Don't lose sight of the "costing element." Eliminate unnecessary travelling. If you have made a special journey, try to arrange other calls in the neighbourhood which you have to visit.

20. If you are dealing with part-time agents, you may have the opportunity of recommending them and their services in the main business to other people with whom you come in contact.

There is much to think over and profit from the above summary.

VOL. XXVI. No. 304.

Legislative Measures in Other Lands,

Holland for many years has been such a happy hunting ground of insurance companies that the number of companies working there must be altogether out of proportion to the amount of insurance available. It is therefore, not surprising to find the Dutch journals discussing the possibility of some measure of State supervision in order to regulate working conditions. It will be interesting to learn whether the majority of subscribers declare themselves in favour of State Supervision of companies other than life. In Poland, the subject of insurances of Polish insurance companies is being discussed in Government circles. The Minister of Finance is reported to have taken the stand that reinsurance abroad is a serious charge on the trends of foreign currencies and the State department has been requested to see that as far as possible re-insurances are effected with home companies. From other Polish quarters there has been some agitation for the formation of a more powerful Polish re-insurance market, chiefly with the purpose of establishing a balance with foreign countries by attracting more foreign reinsurance business to Poland.

An Insurance Congress in Venice.

The Istituto Nazionale delle Assicurazioni, the great Italian State Life Office, is sponsoring an Industrial Life Assurance Congress, which is to take place in Venice from September 28 to 30th. next. The Congress will be opened with an address by Count Volpi di Misurata on the significance of the meeting, followed by a speech by Senator Bevione on the development of industrial assurance in Italy and elsewhere. The work of the Congress is organised in two parts. The first section deals with the functions of industrial assurance in the Fascist State, with four subsections; the second part deals with the problems of industrial assurance and falls equally into four parts dealing with legal, statistical and technical, medical and organisation problems.

SMALL TRADES & RECIPES

Handkerchief Perfume.

Petitgrain oil	160 gms.
Sweet orange oil	160 "
Rose geranium oil	140 "
Jasmine "	130 "
Lavender mont blanc	120 "
Lavender oil ordinary	80 "
Neroli "	80 "
Rose Bulgarian	50 "
Thyme oil	25 "
Palmarosa oil	20 "
Clove oil	20 "
Cassia oil	20 "
Musk ambrette	20 "

Tasteless Codliver Oil.

Codliver oil	64 gr.
Fluid extract of wild cherry	2 oz.
Fluid extract of liquorice	3 oz.
Glycerine	1 oz.
Syrup	1 oz.
Fluid extract of malt	6 oz.
Syrup of hypophosphite	3 oz.

Mix the codliver oil with the glycerine and triturate with fuller's earth $\frac{1}{2}$ oz., add the fluid extracts and syrup, shake and stand for one day with occasional shaking, filter, add the syrup of hypophosphite and mix.

Tobacco Flavour.

Coumarine	70 grams.
Rose otto	20 c.c.
Clove oil	10 "
Lavender oil	80 "
Bergamot "	40 "
Cascarilla oil	30 "
Musk extract	1 "
Civet extract	$\frac{1}{2}$ "
Ambergris extract	1 "
Vanilla essence	1 "
Tinc. of orris	6 "

Tobacco leaves should be properly cured or fermented before the addition of the perfume.

Fumigating Pastilles.

Pastilles are made by powdering the gums, adding the charcoal and potassium nitrate, spraying on the essential oils and finally massing with a mucilage of either gum acacia or tragacanth. An example follows:—

Siam Benzoin	100 grams.
Tolu Balsam	50 "
Charcoal	700 "
Saltpetre	50 "
Sandalwood Oil	50 c.c.
Patchouli "	50 c.c.
Cascarilla oil	30 c.c.
Grain Musk	5 grams.
Mucilage of acacia	as required.

Syrup Glycerophosphate.

Calcium glycerophosphate	200 gr.
Potassium glycerophosphate	100 gr.
Sodium glycerophosphate	100 gr.
Magnesium "	100 gr.
Iron	50 gr.
Glycerophosphoric Acid (20 per cent)	200 drops.
Caffeine	50 gr.
Strychnine	2 gr.
Sugar	8 oz.
Glycerine	4 oz.
Tincture of cudbear	300 drops.
Chloroform	20 drops.
Alcohol	40 drops.
Distilled water to make	20 oz.

Triturate the glycerophosphates, with the glycerine previously mixed with 4 oz. of water. Dissolve the caffeine and strychnine in the glycerophosphoric acid, using gentle heat if necessary and add to the first solution. In this dissolve the sugar without heat and add the other ingredients. Filter through twill calico using talc, if necessary.

India's Industrial Progress.

Village Industries Association.

Dr. Profulla Chandra Ghosh, member-in-charge for Bengal, of the All-India Village Industries Association, has issued the programme adopted by the Board for the improvement of the health of the villagers and effecting an economy in food-stuff. Agents and members appointed in Bengal have taken to it according to their capacity. In this connection, experiments are being made to find out whether wholly unpolished rice is better than even the 'dhenki'-husked rice that is ordinarily available in the village bazar. Bazar 'dhenki'-rice is polished at least twice after the removal of the husk. If only huskless unpolished rice is proved to be better scientifically, it will mean saving of 3 crores of rupees annually for Bengal.

Besides this general programme, Dr. Ghosh has been collecting information and carrying on experiments on four items which are very likely to prove beneficial to the people of Bengal.

'Gur' is prepared from palm-juice in the 24-Parganas, Howrah, Faridpur and Midnapur, but there are thousands of palm trees in Bankura, Birbhum and Burdwan which are not at all utilised for this purpose. From the figures collected from the Diamond Harbour area, it appears that one tapper can tap about 10 to 15 trees and he earns from a minimum of Rs. 120 to a maximum of Rs. 300 during the season of approximately four months. A tree yields on the average

about 3 maunds of 'gur' (82 lb. 1 md.). Palm-gur is very tasteful and has an excellent flavour. It contains about 91 per cent, sugar of which 86 per cent. is cane sugar. From these results it is quite apparent that the people of Bankura, Birbhum and Burdwan can earn lakhs of rupees, if they only take to preparation of palm-gur.

He is also directing his energy to the production of gunny bags etc., from jute and their disposal. It is quite evident that it would be highly beneficial if the cultivators can turn their jute into finished products and find out a market for them.

The third item has been the attempt to improve the present hand-paper industry. He knows its scope is limited. Still it means a lot for a poor country like ours. A Science Graduate is specially devoting his time and energy to it.

The fourth item that is receiving his attention is tanning. The deplorable condition of the Muchis is beyond description. If the village Muchis can take to tanning and preparation of shoes and sandals for the use of villagers, it means bread to those semistarving brethren.

Agricultural Marketing for B. & O.

In accordance with a resolution of the Government of India of 10th January 1935, a scheme for agricultural marketing survey has been launched by the Government of India. It has been decided to appoint a Senior Marketing Officer

and three Assistant Marketing Officers to conduct the survey in every province and on the reports submitted by the Provincial Marketing staff, the Marketing Adviser to the Government of India will make his own recommendations to the Government for consideration.

All the important agricultural products will be surveyed in due course, but in order to ensure that the work is well done, it is proposed to confine the attention of the marketing staff in the first instance to commodities of all-India significance viz., rice, wheat, groundnuts, linseed, tobacco, milk (including milk products capable of being converted into fluid milk, e.g. condensed milk, milk powder, etc.) cattle (oxen and buffalos), eggs, hides and skins, and fruit (citrous deciduous fruit, and bananas). Each of the marketing officers will be allotted certain commodities to investigate into and he will have to prepare a report of his survey. A very comprehensive synopsis and questionnaire have been drawn up and supplied by the Marketing Adviser to the Government of India, and these should always be kept at hand by a Marketing Officer. Information regarding supply, demand, prices, preparation for marketing, grading and standardization, conservation and storage, transportation, distribution, processing and industrial utilisation, weights, measures and units of scales, seeds utilised and all other such matters, will have to be gathered by every Marketing Officer, who will incorporate all the statistics gathered by him in his report with his own suggestions and these reports will be forwarded to the Central Officers at Delhi through the Senior Marketing Officer of the province. The idea underlying the survey is to devise ways and means to make the commodities cheaper to the consumer and get the maximum price for the producer avoiding as far as possible the middleman's profits.

Whisky and Rum From Cane.

The manufacture of whisky, brandy, gin, rum, etc., from cane has been found to be a practical proposition.

The experiment was tried by Messrs. C. S. Rama Aiyer, and R. Somaswaran. Mr. C. S. Rama Iyer, who is in charge of Distillation and Brewing in the Nadars' estate in Trivandrum, was responsible for the manufacture of a kind of brandy called "coco-brandy" from cocoanut toddy. The Government have now, it is learnt, approved the samples of whisky, gin, rum submitted by Mr. Rama Iyer and Mr. Someswaran and have enquired of Messrs. Fraser and Ross of Madras, who are the receivers of the Nadars' Estate whether they could manufacture these liquors on a commercial scale and to submit proposals if they are willing to undertake the manufacture through the Distillery and Brewery in the Estates.

Successful Experiments of Chrome

Tanning in U. P.

Not many years ago 'chrome tanning' was almost unknown in India. Vegetable tannages, chiefly of Babul bark, were in use. Some years back, however, a chrome tannery was started in Madras and only very recently some big tanneries in Northern India took to chrome-tanning. But the processes involved in it being rather complicated and delicate mineral tannage has been considered generally as being outside the pale of ignorant cottage tanners, specially those working in rural areas.

"In view of the superiority of mineral tanning over vegetable tanning, in various respects, efforts have been in progress to devise such cheap and easy methods as would suit the petty and ignorant tanners, mostly inhabiting the villages. Some of these processes have been recently demonstrated at the Co-operative Tannery, Amroha, at Government expenses and the results have

proved generally satisfactory and most encouraging; so that it is now within the reach of even the cottage worker to adopt easy, quick and inexpensive method of chrome and alum tanning and, thereby, turn out better and cheaper leather and in a shorter period than before.

These experiments have opened up the possibilities of making tanning a profitable cottage industry in India and thereby benefiting the vast population of tanners whose economic condition at present is indeed most deplorable. Information in detail can be obtained from the Supervisor, Co-operative Tannery, Amroha, U. P.

Rural Welfare Scheme in Assam.

The Government of Assam has prepared a scheme, which is approved by the Council, for the utilisation of Rs. 5 lakhs granted by the Government of India, for schemes of rural reconstruction in the Province. A committee has been appointed for this purpose to advise the Government to take up the matter in right earnest.

The following programme has been approved by the Committee:—

(1) A sum of Rs. 3,00,000 for rural water supply to be distributed by the Government according to the needs of different districts.

(2) A sum of Rs. 1,00,000 for village roads to be distributed by the Commissioners after consultation with the district officers and the Local Boards provided that the Local Boards concerned undertake to maintain the roads on the completion at their own cost.

(3) A sum of Rs. 40,000 for discretionary grants to be administered by the Commissioners for the purposes of public utility.

(4) A sum of Rs. 40,000 for village sanitation in the form of grants to be made by the Commissioners to village authorities or other suitable agencies.

(5) A sum of Rs. 20,000 for the purchase of irrigation pumps to expand the area on which 'boro' paddy may be safely cultivated under the control of the Director of Agriculture.

Artificial Silk from Cotton Waste.

The sub-committee appointed by the Indian Central Cotton Committee has formulated a scheme to make experiments for the manufacture of artificial silk from cotton waste and an Indian scientist, with seven years' experience in the line in Germany, has been selected to carry out research work which will soon be started in or in the neighbourhood of Bombay.

Enquiry Regarding the Classification of Paper.

The following is a Resolution of the Government of India in the Department of Commerce:—

On the grant of protection to the Paper and Paper Pulp Industries, the Tariff Board recommended that in the event of their proposals in regard to the measure of protection to be afforded to the industries being accepted, steps should be taken at the earliest possible opportunity after the passing of the Act to specify, as definitely as might be possible, the classes of paper which are by ordinary trade usage included in the term "Printing and Writing Paper" as used in the Import Tariff Schedule. In announcing their decisions on the report the Government of India expressed their inability to accept the Board's recommendation.

In accordance with their announcement the Government consulted the various interests concerned in the matter on a broad scheme of classification. The views received have, however, been so divergent that it has been impossible to arrive at any satisfactory conclusion. The Government of India consider that in the circumstances the question should be investigated by the Tariff Board. They have decided therefore to ask the Board to examine the classification of paper for tariff purposes with a view to recommending such changes as may be considered necessary to give to recommending such changes as may be considered necessary to give effect to the intentions of the Legislature in granting protection to printing and writing papers under the Bamboo Paper Industry (Protection) Act, 1932.

Scientific & Technical Topics.

Ice-Cream Bars Are Made Easily with Dipping Outfit.

Less expensive than some other equipment on the market, a new ice-cream bar maker has several desirable features. One is a spreader that holds the bars, with the flat, wooden sticks inserted, in position for dipping in chocolate or similar coating mixture. After dipping, the bars are hung on a rack to dry, the spreader and dipping apparatus being arranged for this purpose. The dipping tank has a 110-volt heater for keeping the chocolate at the proper temperature. A cutting guide with a chilled base to prevent the ice cream from melting, assures that each bar will be of the same size. Standard ice-cream bricks are used in the equipment. The small size outfit is designed to produce between forty-five and sixty dozen bars per hour, while the large size makes 125 to 150 dozen per hour.

Film Makes Colour Photos in any size Camera.

Natural colour photographs can be produced in any size camera by using a new type film that requires no special equipment. A precise machine prints three primary colours, red, green and blue, on the film support, bleaches and then dries it. The colours are applied in criss-cross lines, resulting in a mosaic of colours, but the pattern is extremely minute. In a single square inch of film

surface, there are more than 1,500,000 interstices between the colour lines. These "holes" act as lenses which admit white light and produce blends of the three colours in addition to reproducing whites or blacks. By reversal from negative to positive during the developing process, the image becomes a coloured transparency which may be projected in natural colour by any standard still or motion-picture projector. The tri-colour screen is so fine that colour separation negatives may be made directly for gravure or half-tone reproduction without screen interference. Printing the films on ordinary white paper, such as is used for snapshots, has not been developed to its highest efficiency and further research is necessary before perfect reproductions can be made on print paper. The film, called Dufaycolor, is available for Leica, Contax, Nettel and similar cameras, and will be offered in thirty-five and sixteen millimeter sizes for movies, and in commercial photography sizes up to eight by ten.

Steel Kept Bright By Coating of Lanolin Mixture.

Bright steel parts of stored machinery can be kept from rusting by a coating of lanolin mixture containing about eight pounds of lanolin per gallon of solvent. The solvents are white spirit and naphtha. A little more lanolin is used with naphtha,

Eclipse of Glass.

A new plastic material, evolved by the Department of Scientific and Industrial Research, boasts the clearness and transparency of glass, is half as heavy, elastic, and has the additional advantage of being practically indestructible; only hammer-like blows will smash it. A synthetic resin, it is derived from black coal tar, and treated in its initial stages can be decorated, dyed any colour, and modelled into any shape desired.

Salt cellars, candlesticks, and trinket boxes made from this new product on an ornamental lathe by Lady Gertrude Crawford and Mr. A. L. Hetherington, both well-known turners, were much admired at the art-in-industry exhibition at Burlington House. One handsome candlestick was presented to the Queen.

Further developments are expected in outdoor decoration—ornamental windows and sun traps. The plastic acts as a powerful transmitter of ultraviolet rays.

Vitamin Food from Carrots.

Eating carrots with a medicine dropper is now, figuratively speaking, a scientific possibility. From a carload of the familiar and often-maligned vegetable, experts have found a way to isolate a pound of deep-orange crystals that offer a new weapon against disease. The rare substance of which they are composed, known as carotene, has been identified as the pigment that gives carrots their characteristic colour, and has also been found in butter, milk, spinach, and various leafy foods. Its medical significance, lies in the fact that the body has the power to convert this substance di-

rectly into Vitamin A. If a person normally consumes carrots, milk, spinach, and the like in his diet, he probably gets all the Vitamin A he needs. People who do not enjoy these foods, can have their Vitamin A supply, whenever the physician advises, by adding to a meal a little carotene, dissolved in a few drops of cottonseed oil.

Nitramon.

The newly discovered high explosive Nitramon is not an explosive in the accepted sense of that term, even though it is capable of performing the same tasks as do high explosives. In fact, it has been conclusively proved that this particular blasting substance can be set off only by so powerful a primér as 40 per cent., or stronger dynamite; and at that it requires a dynamite cartridge of at least four-inch diameter and eight-inch length to detonate a cylinder of Nitramon four inches in diameter. In other words there is need not alone for intensity of shock, but also for volume. Of course, where a number of cans of Nitramon are loaded in a continuous column in a quarry bore hole, only one dynamite charge is necessary since the "explosion wave" will propagate detonation of all cans successively.

Since then we have obtained news relating to the non-explosive effect of a high-powdered rifle bullet when shot through the can, and of "cooking" Nitramon with a blow torch. These are effective proof of the claims that no amount of rough handling can cause an accidental explosion of Nitramon and thereby endanger lives or property.

Already Nitramon has proved its value for such important work as quarrying, stripping rock from coal deposits and for some other industrial blasting operations in the open. It is not, however, intended for use in mines other than open pit.

X-Ray Shows Three Dimensions.

X-rays in three dimensions are provided by apparatus recently developed in Russia, and based upon the principle of the parlour stereoscope. Looking through a double eye-piece at twin viewing screens of fluorescent material, an observer sees a picture with lifelike depth, instead of the flat shadow ordinarily obtained on the conventional single screen. The improved view of a patient's internal organs as he swallows, coughs, or breathes is expected to be an important aid in the diagnosis of disease. The illustration above shows the new apparatus and how it is used.

Earth's New "Radio Roof."

Like the layers of an onion, concentric shells of ionization enclose the earth, reflecting back to its surface the radio-waves sent out by broadcasting stations. To three such layers of ionization previously known, the United States Bureau of Standards has just added knowledge of a fourth, 450 miles high.

The new zone reflects signals of such high frequency that they pass through the lower ones. Radiowaves travel in straight lines. These mirror-like reflecting layers make long-distance broadcasting possible.

Oil From Rubber.

The motorist of the future may be able to obtain his petrol and oil from his old tyres. Government chemists of the Fuel Research Board have discovered that by compressing rubber and hydrogen at high pressure and high temperature—a process similar to that used for extracting oil and tar from coal—it is possible to produce either motor spirit or lubricating oil.

In one experiment a temperature of 350-degree centigrade was reached, and a quantity of pale yellow oil equal to about one-eighth of the bulk of the rubber was produced. At a higher temperature, 450 degrees centigrade, the scientists succeeded in obtaining a yield of motor spirit equal to half the amount of rubber used.

The process will not become economic, however, unless the price of rubber falls very considerably.

Machine Traps Auto Thieves.

To trap automobile thieves, a new "remembering machine" has been devised by a California man for use in booths at bridge entrances and similar strategic points. Patterns are punched out, recording the license numbers of cars reported stolen, and are placed in this machine. The attendant then taps out the license number of each passing car on the eight-rowed keyboard of the machine. If one of the numbers is that of a stolen car, a bell rings and a lamp lights, permitting a warning to be flashed to the other end of the bridge to stop the car. The machine may also be used for other tasks that would tax human memory.

Formulas, Processes & Answers.

Clarification of Impure Sugar.

640 G, Karaikudi—Wishes to have processes for clarifying impure sugar for syrup manufacture.

When only ordinary sugar is used in making syrups, the process of clarification is indispensable. This is best done by dissolving the sugar in water and then stirring into it a mixture of fresh milk and water. Mix a quarter seer of fresh milk with an equal weight of cold water. Bring to boil 5 seers of sugar in 1 seer of water, or in proportions as desired. When the whole mass boils up dip a clean cloth in the mixture of milk and water and squeeze this over the boiling syrup moving the cloth round and round all the while for ensuring better distribution over the entire surface of the syrup. Continue boiling when a scum will be observed forming on the surface. Remove this carefully with a ladle. More of the mixture of the milk and water is added little at a time and the same process of removing the cum is repeated till the surface remains free from scums on the addition of the mixture. Thus clarified the simple syrup can be employed with good results in syrup making.

Removing Stations on Marbles.

It is impossible to get all the oil out without injuring the marble. A portion can be extracted by thoroughly washing the slabs, and then coating the stained parts with slaked lime and potash,

applied when hot. Allow this to remain for a day or two, and then wash it off and repeat the process. No acids of any kind should be used, as they will destroy the marble.

Drilling Hole in Glass.

A hole may be drilled in glass with a metal drill and a brace, using turpentine freely to lubricate the drill, but the operation will be very tedious. When the hole is cut it may have to be enlarged with a half round file and turpentine,

Liquid Soap.

654 J. K. K. I., Madura—Wants to have a formula of liquid soap for finishing dyed fabrics.

Coconut oil	130 seers.
Caustic potash lye, 28°Be	125 "
Sugar	72 "
Borax	2 "
Water	267 "

Run the oil in a jacketted kettle and heated to about 120°F. The potash lye is then added to the oil. Saponification takes place, the mass swells rapidly and may foam over the sides unless a kettle of about 4 to 5 times the capacity of the total charge of soap issued. When the saponification has occurred, the sugar, and borax are added, the water is run in and the mixture stirred until the soap is thoroughly dissolved. Heat helps materially in dissolving the soap. The soap is then allowed to cool and if colour

or perfume is to be added this is stirred in.

Sizing Textiles.

138 H. P. K., Bombay—Wishes to have a method of sizing textiles.

For this service hide grease finds extensive use because of absence of the most objectionable impurity sulphur dioxide or sulphites. As the colours employed for dyeing fabrics are much more delicate than those used in paper and are usually soluble, the absence of traces of mineral acids or alkalis is also indicated.

Bone glue is used on cotton goods to stiffen and give body to the material. If solution of this glue is too thin it will penetrate the pores of cotton fibre to such a degree that the latter will be altogether too stiff to use, while if it is too viscous it will not be absorbed at all and will fail to dry out during passage through drying chamber. The desired results are obtained when a very dilute solution of this glue is treated with a solution of alum. The alum thickens the solution and is satisfactory because no precipitation will result.

In case of shade cloth where firmness with flexibility is desired—strong high grade ghee is used.

Fly Spray.

460 B. C. B., Basrah—Wishes to know good formulas for preparing fly spray.

This is made by macerating 500 grms. of pyrethrum with 4 litres of kerosene (followed by expression) after 24 hours. Perfume by adding 90 c.c. of methyl salicylate to each 4 litres of solution.

II.

Pyrethrum	240 gm.
Kerosene	2000 c.c.
Gasoline	2000 c.c.
Naphthalene	30 gm.

Macerate the pyrethrum in the petroleum liquids for 48 hours, then strain, express and then add the naphthalene.

Fruit Salt.

692 R. V. S., Madanapalli—Desires to know formulas for preparing fruit salt, malt, and also the process of making tinctures.

Tartaric acid	2 parts.
Sodium bicarbonate	2 "
Magnesium sulphate	1 part.
Potassium bitartrate	2 parts.
Magnesium citrate	2 "
White sugar	4 "

Powder the ingredients separately and mix.

Malt.

To prepare malt steep barley in water for two or three days when it will swell, and become somewhat tender, and the water is coloured reddish-brown. Now drain off the water and spread the barley upon a stone floor about two feet deep. Head develops into it and the barley begins to germinate the radicle making its appearance first. At this stage stop the growth of the grain by spreading it more thinly, and turning it over for two days. Now rake up into heaps and allow it to stand for a day, when it becomes hot. Dry the grain thoroughly in a kiln by a slow, regulated heat when the material will be converted into malt.

Tincture Making.

Tinctures are usually prepared by reducing the solid ingredients to small fragments coarse powder, or fine powder, macerating them for 7 days, or longer, in proof spirit or rectified spirit, straining the solution through linen or calico (or paper), and finally expressing the residuum strongly, to obtain what fluid is still retained in the mass. They are also advantageously prepared by the method of displacement of percolation.

Badami Hulwa.

758 B. G. H., Nagpur—Desires to know the formulas of badami hulwa, Reneweing Laces, etc,

Almond	1 seer.
Ghee	1 "
Cassia leaves	4 seers.
Cardamom seeds	4 "
Saffron	2 annas weight.
Sugar	$\frac{1}{2}$ seer.
Raisins	$\frac{1}{8}$ seer.
Milk	$\frac{1}{2}$ seer.
Camphor	1 rati.
Water	$\frac{1}{2}$ seer.

Bray the almonds to a paste after skinning them; then melt the ghee on a pan and singe the spices in it. Cook the almond paste in this treated ghee until brownish and boil in milk and water. When ebullition occurs add the raisins and after a while sugar. Sprinkle the camphor after removing and cover up.

Gas Mantle Preserving Solution.

Cerium oxide	1 dr.
Thorium oxide	1 dr.
Prepared chalk	$\frac{1}{2}$ oz.
Aniline magenta	$\frac{1}{2}$ gr.
Water to make	8 oz.
Mix.	

Renewing Laces.

Sew the lace in a clean linen cloth, boil it in 1 quart of soft water and $\frac{1}{4}$ lb. of soap, and wash it in cold water. If tarnished, apply a little warm alcohol to the tarnished spots.

Removing Stains from Cloth.

947 S. N. K., Multan city—Desires to know methods of removing stains from cloth.

INK STAINS FROM COTTON.

If the stain is a deep one then two chemicals are required (1) oxalic acid and (2) sodium hydrosulphide.

Take 1 gram of each of the chemicals and dissolve it in a separate vessel. Apply first oxalic acid after dipping it in water over the stain and let it remain in the same position for five minutes and then treat the same stain in the vessel containing sodium hydrosulphide at boiling temperature. By working two or three times the stain gets lighter.

Ink Stain from Woollen & Silken Garments.

First the ink spot is thoroughly soaped with ordinary soap. The stain spreads. Oxalic acid is applied over it then hydrosulphide is rubbed over it. The stain gets lighter. Prepare 20 per cent. soap solution at boil on naked fire and work the stain. The stain is removed. Mostly basic colours are used for making inks and some times these stains are very difficult to remove because basic colours have got affinity for animal fibre.

Oil Stain from Cotton.

All vegetable oils, ghee. First of all use 5 per cent NaOH (caustic soda) solution over the stain for about 15 minutes at 140°F. The oil or ghee is saponified and a sort of soap is formed and then wash with hot water to remove the stain.

Fresh Blood Stain.

First of all wash the stain with soap solution then wash thoroughly in water. Apply oxalic acid of 1 per cent solution and let the garment lie for about 5 minutes. Wash well. Work it in 2 per cent. potassium permanganate solution for 10 minutes. Squeeze and without washing work it in sodium bisulphide solution in which little sulphuric acid is added; the stain is removed.

Old Blood Stain.

First of all the stain is worked in 5 per cent oxalic acid solution for about 10 minutes. It is then washed. It is bleached with permanganate and bisulphide as told above. The stain will be removed.

Milk Powder.

962 A. C. P., Calcutta—Wants a process of preparing milk powder.

Take carbonate of soda $\frac{1}{2}$ dr.; water 1 fl. oz. Dissolve, add fresh milk, 1 quart; sugar 1 lb.; reduce it by heat to the consistence of a syrup, and finish the evaporation on plates by exposure in an oven.

Antiphlogestic Paste.

997 B. G. N., Nagpur—Wants recipe for antiphlogestic paste and also processes for preparing liniments, etc.

Kaolin	565.0	grms,
Boric acid	45.0	"
Thymol	0.5	"
Methyl salicylate	20	"
Oil of peppermint	0.5	"
Glycerine	387.0	"

Take kaolin and heat it to 110°C to drive off all traces of moisture and then allow it to cool and reduce to fine powder. Now mix the kaolin with the boric acid, and then thoroughly incorporate the warm glycerine, which has in the meantime, been rendered anhydrous by heating it for a short time to 100°C.

Finally, add the thymol, dissolved in methyl salicylate and oil of peppermint, and made into a homogeneous mass. Preserve it in air-tight containers. When required for use place the container for a short time over warm water and then spread evenly on a piece of cloth by means of a spatula and apply over the affected parts.

Liniments.

A fluid, semi-fluid, or soapy application to painful joints, swellings, burns, etc. The term is also occasionally extended to various spirituous and stimulating external applications. A preparation of a thinner consistency, but similarly employed, is called an 'Embrocation.' These terms are, however, frequently confounded together and misapplied. Liniments are generally administered by friction with the hand or fingers; or with some substance (as a piece of flannel) capable of producing a certain amount of irritation of the skin. Sometimes a piece of linen rag dipped in them is simply laid on the part. In most cases in which liniments are found bene-

ficial, the advantage obtained from them is attributable rather to the friction or local irritation than to any medicinal power in the preparation itself. The greater number of cerates and ointments may be converted into liniments by simply reducing their consistence with almond or olive oil, or oil of turpentine.

Poultice.

Poultices (cataplasmata) are generally prepared with substances capable of absorbing much water and assuming a pulpy consistence, so as to admit of their application to any surface, however irregular. Their curative action principally depends upon the liquids with which they are moistened, and the heat retained by the mass. With this object they should never be heavy or very bulky, and should be frequently repeated, and lightly but securely bandaged on to prevent displacement.

The addition of a little lard, olive oil, or still better, glycerin, to a poultice, tends greatly to promote its emollient action and to retard its hardening.

Plaster of Mustard.

This is always an extemporaneous preparation. Flour of mustard is made into a stiff paste with lukewarm water, or with vinegar, and is then spread on a piece of calico or linen (folded two or three times); over the surface of the mustard is placed a piece of gauze or thin muslin, and the plaster is then applied to the part of the body it is intended to medicate. Its action is that of a powerful rubefacient and counter-irritant; but its application should not be

continued long, unless in extreme cases. Its effects are often apparently powerful.

Pain Balm.

Vaseline	44	parts.
Methyl salicylate	10	"
Oil of Eucalyptus	2	"
Menthol	2	"
Wool fat	20	"

Mix thoroughly and put in wide mouthed bottles. It may be rubbed gently over the affected parts.

Brilliantines.

Olive oil	4	oz.
Glycerine	3	"
Alcohol	3	"
Oil of neroli	20	mins.
Oil of verbena	5	"
Oil of lemon	50	"
Oil of rose geranium	5	"

Mix one by one with thorough stirring. Shake before use.

Bleaching Fats.

850 N. K. S., Agra—Desires to learn a process of bleaching fats.

Heat 100 lbs. of fat by steam to 150° or 160°F until it is all melted. Allow it to cool to 110°F., and add the bleaching liquid slowly, with constant stirring, into the fat. The mixture will soon assume a dark green colour, which becomes lighter by stirring. When a sample has been taken from the mass, and shows no essential change the bleaching process may be considered finished. Allow the whole to cool and rest for 6 to 10 hours; run off the clear liquor, and wash the fat with 10 to 20 lbs. of water as required.

Bleaching liquor as mentioned above may be prepared thus:

For every 100 lbs. of fat dissolve $\frac{1}{2}$ to 1 lb. bichromate of potash in $1\frac{1}{2}$ lbs. ($1\frac{1}{2}$ pints) of boiling water and add 3 lbs. hydrochloric acid of 22°Tw., or 2 lbs. sulphuric acid about 80°Tw.

It must be noted here that if the fat is very dirty, it may be treated with a weak solution of either caustic or carbonate of soda, and allowed to cool; then run off the solution, and treat as above.

Removal of Tattoo Marks.

1020 N. & S., Hingoli—Wants a process for removing tattoo marks.

Apply a highly concentrated tannin solution to the tattooed places and treat them with a tattooing needle as the tattooer does. Next vigorously rub the places with a silver nitrate stick and allow the nitrate to act for some time until the tattooed portions have turned entirely black. Then take off by dabbing. At first a silver tannate forms on the upper layers of the skin, which dyes the tattooing black; with slight symptoms of inflammation a scurf ensues, which comes off after a fortnight leaving behind a reddish scar. The latter assumes the natural colour of the skin after some time. The process is said to have good results.

Sealing Wax.

1025 H. C. K., Calcutta—Desires to know formulas for making sealing wax.

RED.

Button shellac	14 parts.
Rosin	24 "
Vermillion	14 "
Barytes	14 "

Whiting	4 parts.
Turpentine	1 part.

Melt shellac and rosin; keep hot and work in pigment and finally the turpentine. Cast in sticks.

BROWN.

Orange shellac	26 lbs.
Rosin	83 "
Turpentine	74 "
Whiting	32 "
Silex	31 "
Burnt umber	4 "

Printing Inks.

1040 M. & M. P. W., Lahore—Wishes to have formulas for manufacturing printing inks and roller composition.

BLACK.

Carbon black	20 lbs.
No. 0 Lithographic varnish	30 "
Rosin Oil	30 "
Cobalt drier	10 "
Stearine pitch	5 "
Mix intimately in a mixing machine.	

YELLOW.

Chrome yellow	75 lbs.
No. 0 Lithographic varnish	25 "
Lead-manganese drier	2 "

RED.

Lithol Red	45 lbs.
No. 0 Lithographic varnish	50 "
Drien	5 "

Roller Composition.

Powdered glue	1 part.
Glycerine	$1\frac{1}{2}$ parts.
Water	1 part.
Sugar	$\frac{1}{2}$ "

Add glue and sugar to the mixture of water and glycerine and stir well. Allow to stand until the glue is thoroughly soaked and then place on water bath and melt. When the mass is completely molten and all air bubbles have risen to surface, it is ready to be poured into moulds.

Synthetic Fruit Essences.

1056 P. I. H., Rawalpindi—Wants recipes for preparing synthetic fruit essences.

ALMOND ESSENCE.

Isopropyl alcohol	5 pints.
Distilled water	1½ "
Benzaldehyde (chlorine-free)	1 pint.
Glycerine	½ "

Dissolve benzaldehyde and glycerine in the alcohol, then add the water (warm preferred) in small amounts, shaking after each addition. No colouring is added.

RASPBERRY.

Isopropyl alcohol	80 fl. oz.
Raspberry juice	23 "
Tincture orris	24 "
Acetin	24 "
Ethyl acetate	6 "
Amyl acetate	1 "
Spirit nitrous ether	1 "
Tartaric acid	1 oz.

Mix, tint red, shading with burnt sugar.

STRAWBERRY.

Glycerine	3 fl. oz.
Tinct. Orris	3 "
Distilled water	2 "
Amyl acetate	½ "
Ethyl acetate	3 fl. dr.
Tartaric acid	1 dr.
Spirit nitrous ether	1 "

Mix as usual. Add fruit juice the same quality as in raspberry.

VANILLA.

54 O. P. spirit	80 fl. oz.
100% vanillin	1½ lbs.

Dissolve. Then dilute with sufficient hot syrup to make 2 gallons.

RATAFIA.

Lemon peels	4 gm.
Orange flower water	10 "
Tartaric acid	60 "
Alcohol	11½ lit.
Mix.	

Duplicator.

1115 V. A. H., Pernambut—Wants a recipe for making duplicator.

Gelatin	20 parts.
Water	80 "
Glycerin	240 "
Barium sulphate	16 "

Cut the gelatin in small pieces and soak for 12 hours in the water, then add the glycerin. Heat gently on a water bath to effect solution and then incorporate barium sulphate thoroughly. Lastly pour into a suitable flat box.

Hair Cream.

1138 B. C. B., Basrah—Wishes to have a recipe for preparing hair cream.

Lime water	2 lbs.
White wax	1 oz.
Almond oil	2 lbs.
Glycerin	2 oz.
Oil of verbena	1 dr.
Oil of lemon	6 dr.

Oil of bergamot 3 dr.
Melt the wax in a few ounces of the oil and add the rest of the oil, previously warmed. Mix the glycerin with the water, and add to the whole of the oils gradually and with constant shaking.

READER'S BUSINESS PROBLEMS

[Reader's business problems will be discussed in these pages. We invite the reader to write us his difficulties. As the department is in charge of an experienced businessman who is specially adept in dealing with such problems and to whom experiences of a large number of successful business men are available, his replies will lead the enquirer to a successful career. These replies will be published in the paper only and cannot be communicated by post.]

Qualifications of a Successful Salesman.

914 R. K. M., Vizianagram—Writes "What qualities do you consider essential for a successful salesman?"

Before actually dealing with the subject I shall try to impress upon the mind of our readers what salesmanship is. Psychologically speaking, salesmanship is evidence that convinces the reason and judgment; persuasion that stirs the feelings to action and whether verbal or written, the message is given in language that creates vivid concrete pictures in the imagination. Salesmanship is the power to convince. Salesmanship is the power or ability to influence people to buy at a mutual profit that which we have to sell but which they may not have thought of buying until we called their attention to it. An inclusive definition to salesmanship involves the idea of (1) mutual profit, benefit, and service; (2) ability to influence, based upon scientific knowledge, fidelity to truth, effectiveness to presentation; (3) character that is aggressive, and magnetic, and results in beneficent power over men.

A sale involves four factors: the salesman, the customer, the goods and the sale itself. The salesman, to be successful, must have a strong, healthy body full of vigour and nervous energy; a clear, logical mind capable of accurate reasoning and a strong emotional nature that can feel and inspire enthusiasm.

The good salesman must know his goods, their origin, structure, composition and usage; he must know his customer, his nature and needs, that he may serve him as expert adviser for mutual profit.

Seven processes are involved in a sale, the introduction, the securing of attention, the arousing of interest, the producing of connection, the creating of desire, creating resolve to buy, and the closing of the order.

The customer's interest or benefit must be kept foremost in every process of the sale.

The selling talk must be carefully prepared in accordance with the principles of salesmanship the line of argument must be clearly in mind; and the presentation must be made in a clear, logical and convincing manner. The appeal must be made to the heart as well as to the head.

Well developed reason, imagination, judgment, and will are essential to the largest success.

The travelling salesman must be a travelling educator, instructing his customers in the character and use of his goods, and in the best methods of selling them. Thus the sales to merchant, salesman and house will be increased and competition forestalled.

The greatest salesman is one who is thirsting after a broader knowledge and more thoroughness; who seeks to im-

prove his method of expression, his vocabulary, his command of good English who cultivates to it, courtesy, and cheerfulness good appearance, right character, and strong personality.

The Requirements of an Insurance Agent.

721 J. D. L., Lahore—Writes "Will you please discuss in the column of your esteemed journal the prospects and requirements of an insurance agent?"

That the insurance business is expanding day by day and holds out great possibilities is common knowledge. The insurance companies in the country, though limited in number, transact a huge amount of business annually and insurance agents have extraordinary chances of earning fat dividends by diligence and intelligent work. The occupation of an insurance agent is both lucrative and respectable. The profits that successful men in the line make are quite decent and should attract worthy youngmen more and more. But the career presupposes zeal for work, able canvassing capacity and capable salesmanship. The work sometimes seems tiresome and the first few months are the most trying period in the life history of an insurance agent. Disappointments are met with more often than progress and at times become heartbreaking.

A prospective insurance agent should before trying for an agency master the technicalities of the insurance business and should make it a point to acquire a fairly good knowledge of the general business of insurance, specially what facilities this business offer to the prospective customers.

Vol. XXVI. No. 304.

On appointment the first duty of the agent should be to study the prospectus and other business literatures of the company as if they are examination papers and discuss them by himself till he is familiar with all its ins and outs and is thoroughly acquainted with its strong points.

Acquaint yourself as thoroughly with the full history of the company and its workings as possible. A knowledge of the affairs of other companies working in the same line is also covetable as this enables the agent to discuss on solid grounds when the names of other companies crop up. The aim of an agent is to make a name by tactful ability and efficient service. He should be in a position to explain why he is convinced that the methods and rates of his company have advantages over those of his rivals. On the forceful and convincing talk on this point depends the success of the agent not to a little extent. He should be aware of all the alloys in the local insurance affairs and by dint of his knowledge of rival institutions should be able to show how the policy and general conditions of one company are in some respects not so good for the customer as that of the agent's company whereas in other respects they are less advantageous.

Making a Catalogue.

1012 P. K. D., Sind—Writes, "Will you please advise me on making a catalogue?"

In mail order and many other businesses, the preparation of catalogues is a matter of importance. A catalogue is a combination of advertise-

ment, circular, price list, etc. Its preparation involves considerable time and trouble if it is to be in any sense effective. The person having charge of its compilation will always consult with the heads of all departments. In this way he will make a list of goods with a full description of their qualities, prices and other important data. If there be an advertisement writer in the office he should submit samples of advertisement suitable for the several classes of goods to be catalogued, otherwise he should requisition an advertisement writer from outside on contract basis. Now illustrations are essentially required for an up-to-date catalogue, so it will be the duty of the compiler to see that good blocks are prepared. A very important matter is the compilation of the index, which should at all times be exhaustive. It is well known to businessmen that a complete index considerably enhances the value of a catalogue.

Collecting the Dues.

89 P. L. A. Allahabad—Writes, 'Will you please advise me on collecting of dues?'

The work of collection of dues requires the greatest tact and care. You must be unsparing in the matter of collections, for without this you cannot long hope to conduct your business smoothly, but at the same time you ought to make it easy for the debtors to pay, say, by instalments and by other concessions. A little thinking with reference to your stores and customers will bring out systems which you can conveniently apply to the different lines of your business.

One of the first essentials that bring in collections in time is to create an impression upon your customers that your business is run on a thoroughly up-to-date line. This will establish respect for your house and money will arrive automatically. Make it a point to send intimation as soon as the period of credit expires or the limit of credit is exceeded. Show that you are in right earnest about collection by sending your assistant if remittances are not forth coming. This regular campaign done in a friendly manner would convince your customers that the settlements of your accounts cannot be left out of consideration and also paves the way for easier collections in future. Straightforward businessman will quickly realise that they are merely being done to as they wish to be done by.

Forwarding Agent.

1015 N. N. S., Dacca—Will you please discuss the prospect of a forwarding agent.

The forwarding agent is a person employed to collect and deliver goods on behalf of others. In these days when the inland and overseas trade has assumed tremendous magnitude the part that a forwarding agent plays in the collection and distribution of commodities must be of far-reaching importance and youngmen with a knowledge of port regulations, customs formalities, shipping, railway and steamer business can establish themselves as forwarding and clearing agent.

BRIEF QUERIES AND REPLIES.

{ Questions of any kind within the scope of Industry are invited. Enquiries or replies from our experts will be published free of charge. Questions are replied by post on receipt of As. 4 stamps of small value only for each question. In order to facilitate the work of Editor's Department and to help prompt action the readers are requested to send enquiries in separate letters. }

925 S. P., Rampur—You may start ink industry, hand making and cigar manufacturing industry. These industries will not require large investment.

926 R. H. P., Borivli—For mastering English you may write to the Tutorial Institute, Feerton Road, Delhi.

929 M. S., Amritsar—In making alum blocks first liquefy alum, add glycerine, zinc white as directed in the process given in February 1935 issue of Industry. When concentrated pour the liquid in a flat tray. Then in course of time whole will crystallise. Then use this with a saw. You may use any kind of earthen pot. Detail process of alum block making will be found in February 1935 issue of Industry. Demand for nail ointment is not so keen.

930 R. C., Jhelum—Formulas of chalk crayons will be found in July 1934 issue of Industry. Colour may be had of Abinash Chandra Dutta, 23/2, Dharamtala Street, Calcutta.

931 S. R. H., Dinapore Cantt—Statistics for production and consumption of catechu in India are not available. You may however consult Manufacture of Catechu by B. Sen Gupta published from this office.

933 R. I. C., Moulmein—Process of manufacturing aerated water will be found in Profitable Industries published from this office.

936 P. E. W., Peshawar—Gramophone machine and cabinet may be had of Carr & Mohalanobis, 3, Chowringhee Road, Calcutta; M. L. Shaw Ltd., 5/1, Dharamtala Street, Calcutta and James & Co., Navsari Bldgs, Hornby Road, Fort, Bombay.

937 K. R., Mainpuri—Refer your query to the Consul-General for Japan, 26-27, Dalhousie Square, Calcutta.

938 V. S. H., Tanjore—Machines required by an optician may be had of Lawrence & Mayo Ltd., 16, Old Court House Street, and Stephens & Co. Ltd., 33, Bowbazar Street; both of Calcutta.

939 R. S. P. C., Madura—(1) You may consult medical directory published by B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta. (2) Other addresses you require will be found in Industry Year Book & Directory published from this office. (3) For popularising your medicine advertise widely and send free samples to doctors in different parts of the country and request them to try your medicine. After trying if your medicine is found to be efficacious doctors will prescribe it to their patients. Thus your medicine will be popular very soon.

940 V. M., Sirsa—All correspondence should be in English and not in Hindi or Urdu.

941 M. J. B. R., Katmandu—(1) For starting a celluloid factory you have to invest at least Rs. 50,000. Various up-to-date machines for punching cutting, trimming and polishing, toothing, stamping, etc. are required for a well equipped celluloid factory. For machinery required write to Indo-Japanese Commercial Museum, 135, Canning Street, Calcutta. (2) The manufacture of razor blades is easy and a plant capable of producing 5000 blades in 8 hours will cost about Rs 5000. For machines write to The Baird Machine Co., Bridgeport, Connecticut, U. S. A.

Machinery for the Manufacture of

Chemicals, Powder, Hair Oils, Creams, Perfumes, Pills, Tablets, Drugs, Medicines, Artificial Ghee, etc. Also:—

Chemical Plant, Oil Mills, Filter Presses, Sugar Mills & Centrifugals, Tin Box Making Machinery, Sterilisers, Laboratory Apparatus, Biscuit and Bread Making Machinery, Laundry Machinery, Tube-filling Machinery, Winnowing Machinery, Threshing Machinery, Fruit Preserving Machinery, Water Softening Plant, Slate and Stone Working Machinery and Pumps for all purposes.

W. J. ALCOCK & CO., 7, Hastings Street, Calcutta. Saroup & Bansilal, 57, T Lahore. Agent for Bareilly District KODESIA ENGINEERING CO., Naini Tal

942 N. S., Gulbarga—(1) Glass bottles may be had of Shah & Co., 55, Ezra Street, Calcutta and Satya Charan Paul & Co., 194, Old China Bazar Street, Calcutta. (2) Labels may be had of the former party. (3) Soap stamping machines may be had of J. Mayr, 1, Mission Row, Calcutta.

943 E P K N B, Mukkudal—(1) Following is a list of printers: Fuju Kaishindo, Printing Co., 232, Nishu Imasato cho, Higashimari-Ku, Osaka and Hayashi Obundo, 41, Edobori Minamidori, 1-Chomie, Nishi-ku, Osaka; both of Japan. For Japanese goods write to Indo-Japanese Commercial Museum, 135, Canning Street, Calcutta.

944 S. K. D., Secunderabad—Process of making palm oil, wood grease, etc will appear in an early issue of Industry.

945 T. K. R. I., Tanjore—(1) Electroplating can be started with a capital of Rs 1000 to Rs 15,000 according to work intended to be taken, the work is specially suited to youngmen who can secure work or who want to manufacture articles requiring to be electroplated. (2) Cardboard box making is undertaken by special daftries who manufacture boxes with the help of machines. For this purpose you need not invest more than Rs 10,000 (3) An article on envelope manufacture appeared in August 1934 issue of Industry. (4) Yes, you may start coffee grinding and roasting business. For this business you should engage an expert. (5) I think manufacture of sewing needles and gramophone pins will not be suitable at present.

946 A. M. S. S., Colombo—The recipe you tried will produce liquid hair dye of good quality. Defect of the hair dye manufactured by you is due to defective manipulation. First dissolve nitrate of silver in distilled water and add ammonia when silver will precipitate. Now add more ammonia so that silver which has already precipitated will again dissolve. Then proceed according to the instructions given in the book.

947 S. N. K., Multan City—Process of removing stains from cloths appears elsewhere in this issue.

948 K. C. I., Bhimber—(1) Fuller's earth may be had of Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane, Calcutta. Fuller's earth

is mined in the Central Provinces and in Rajputana. It is used in washing cloths, etc. and sometimes adulterated in soap manufacture. (2) We do not know particulars of bentonite. You better have it analysed by K. V. Briggs & Co., 8B, Lall Bazar Street and Sudhindra Nath Sen, 6, Kirti Mitter Lane; both of Calcutta.

951 V. P. M. O. M. S, Madras—Cinematograph machines may be had J. F. Madan & Co. Ltd, 5, Dharamtala Street and Adair Dutt & Co, 5, Dalhousie Square; both of Calcutta.

955 M. N. Hassan—You may have a complete set of soap manufacturing machines from Rustomji Nowroji Bapasola, 62, Forbes Street, Fort, Bombay; Malik Engineering Co., 39, Jora Pukur Lane, Calcutta; P. N. Dutt, 3A, Raja Kali Kissen Lane, Calcutta. For soap stamping machines and dies you may also communicate with Small Machinery Mfg. Co., 22, R. G. Kar Road, Calcutta.

957 M. B., Goa—We are not aware of any chemical process for the extraction of coir from coconut husks. You may however send your enquiries to the Industries Department, Government of Madras, Madras, who are investigating among other subjects on coir making

960 V. C. M., Nowgong—Particulars about the important paper mills of India follow: Titagur Paper Mills Co. Ltd., Managing Agents F. W. Heilgers & Co, Chartered Bank Bldgs., Calcutta; capital issued and subscribed Rs. 19,05,955, (8 paper mills) (2) Bengal Paper Mill Co Ltd., Managing Agents Balmer Lawrie & Co. Ltd, 103, Clive Street, Calcutta; capital issued and subscribed Rs 15,00,000. (4 paper mills.) (3) Deccan Paper Mills Co. Ltd., 815-816, Bhowanipeth, Poona; (4) Girgaum Paper Mills, Girgaum, Bombay; (4) Upper India Couper Paper Mills, Lucknow, Manager, J. N. Sinha, Capital authorised and paid up Rs. 8,00,000 (2 paper mills). You may consult the following books on photography: (1) The Complete Photographer by Bayley (R. Child), 15s. net; (2) The Photographic Instructor by J. I. Figg, 4s. For bee-keeping read (1) Bees and Bee-keeping by Chesire; (2) Bee-keeping published

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by the Agricultural Research Institute, Pusa. For mastering tailoring read Practical Guide to Cutters by A. Moitra published by Saradaya, 59, Mirzapur Street, Calcutta. For industrial books of all sorts you may write to Chakravorty, Chatterjee & Co., 15, College Sq., Calcutta; Book Co., 4/4A, College Square, Calcutta. There are horticultural societies at Saharanpur, United Provinces and at Alipore Road, Calcutta. They can supply books, seeds, etc. Thread making machines may be had of Oriental Machinery Supplying Agency, 20/1, Lall Bazar Street, Calcutta. Picture frames are sold by Fotic Lall Seal & Sons, 10, Swallow Lane, Calcutta and National Art Gallery, 152, Lower Chitpore Road, Calcutta. Glass sheets are imported by Kunja Behari Chandra, 10/1, Swallow Lane, Calcutta; Kanai Lal Dhur, 11, Swallow Lane, Calcutta.

961 V. K. A. R., Rajahmundry—Aluminium wares are manufactured by (1) Bombay Aluminium Factory, Near Husani Baug, Madanpura, Bombay; (2) Dun Aluminium Factory, 107-109, Tardeo, Bombay. (3) Aluminium Mfg. Co. Ltd., 9, Clive Street, Calcutta; (4) Jeewanlal (1929) Ltd., 11, Clive Street, Calcutta; (5) Indian Aluminium Co., 32, Triplicane Co., Madras; (6) Eagle Manufacturing Co., Gujranwala; (7) Rangoon Aluminium Works, 108, Insein Road, Rangoon. Aluminium wares of foreign make are imported by Wolverhampton Works Co. Ltd., Bank of Baroda, Apollo Street, Bombay. Crucibles may be had of Francis Klein, 1, Royal Exchange Place, Calcutta.

969 N. D. O., Batala—Hosiery goods of all sorts may be bought of Ebrahim Allarukhna Rahim, 39, Armenian Street, Calcutta; Calcutta Hosiery Agency, 55/1, College Street, Calcutta. You may get regular supplies of umbrellas from (1) Mohendralal Dutt & Sons, 49, Harrison Road, Calcutta and Nandalal Dutt, 131, Old China Bazar Street, Calcutta. Please state names of other lines you are interested in when we shall try our best to put you in touch with reliable merchants. For enquiry about Japan

communicate with Indo-Japanese Commercial Museum, 135, Canning Street, Calcutta. Names and addresses of trade journals in Germany and Japan follow: Ubersee Post, 1, Solomon Strasse, Leipzig, Germany; Commercial Osaka published by Osaka Commercial Museum, Osaka, Japan; Japan Trade Review published by the Yokohama Chamber of Commerce and Industry, Yokohama; Japan Exporter, Japan Exporter Publishing Co., Central P.O. Box No F 137, Tokyo, Japan.

970 R. S. A. Lucknow—To mark upon meat use Rubber stamp ink, recipes of which you will find in the Manufacture of Ink which you already have with you.

971 N. C. M. Co., Baroda—You may try the following paste: Starch 2 dr.; white sugar 1 oz.; gum arabic 2 dr.; water q.s. Dissolve the gum, add the sugar and boil until the starch is cooked.

972 G. L. M., Shikarpur—You may take up the course of Industrial Chemistry as taught by the Calcutta and other Universities. When you have gone through this course you will possess a fair knowledge of the manufacture of various chemicals. You may also read books on industrial chemistry such as those by Martin or Thorpe.

973 P. B. D., Multan Cantt—For a list of Japanese and German trade journals refer to No. 969. For stationery you may write to (1) Asai Shoten, No. 28, 2-Chome Itachibori Minami-dori Nishiku, Osaka; (2) Nippon Enpitsu Kabushiki Kaisha Co. Ltd., 397 Ikebukuro, Nishisuga-momachi Tokyo; (3) Fritsch Max, 12/13 Schinke Str., Berlin S. 59.; (4) Oppenheimr. Sulzbacher, Nurnberg.; (5) Richard Scheller, Dresden A-19.

976 L. G. & Co., Kankhal—(1) No recipe of petrol economiser is known. (2) An apparatus has been made which when fitted in a motor car saves petrol consumption. For details you may write to F. Staheli & Co., 8, Old Court House Street, Calcutta. (3) For a recipe of

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blood purifier consult a medical practitioner. (4) We know of no remedy which will turn black face into fair complexion. Use of beauty creams may be efficacious to some extent.

978 B. B. D., Darbhanga—For plaster of Paris used in bust making write to Calcutta Mineral Supply Co., 31, Jackson Lane, Calcutta China clay is supplied by Vizianagram Mining Syndicate, Main Road, Vizianagram; and D. Mullick & Sons, Panchanantala Road, Howrah.

979 P. C. S., Arrah—Pure magnesia, tar, tar of commerce, and salammuniac are obtainable from all chemists and druggists. You may try B. K. Paul & Co., Ltd; 1 & 3, Bonfields Lane, Calcutta This is supplied by Burma Finance and Mining Co Ltd, Tavoy, Burma; for copper write to Cape Copper Co. Ltd, Rakhamines, Singlibhum.

980 K. C. G., Rawalpindi—You may go in for M. Sc degree in Industrial Chemistry This course will give you an insight into the manufacture of various produce of vital importance to the country. If funds permit we recommend you to go to some foreign country where you can have first hand experience in making of a particular article which we leave to you for selection. As you have completed the B. Sc. course of Industrial Chemistry, you have no doubt acquired liking for a certain industry. You can pursue further studies on that industry but if possible have practical training which alone can make one a successful industrialist.

981 H. A. Shikarpur—Vegetable oil and ghee are fats no doubt but have quite different general composition, and hence they do not mix and agree with each other. You may however use hydrogenated oils. Process of hydrogenation appears in Vegetable Oil Industry published from our office. Recipe of beauty wax will appear in an early issue of Industry.

983 K. S. Mirzapur—As you are already in the cloth business, it is better for you to extend your line than to take up a new one. You may for example stock piecegoods, coatings, shirtings and even umbrellas. You may also have a tailoring shop attached to yours.

985 R. P. D., Dadar—The demand for artificial silk yarn in the country is daily growing keener. Each year the imports are growing up. During 1934 imports of artificial silk yarns rose in quantity by 7 million lbs. and in value of Rs 48 lakhs. There is a great prospect in this line, provided the process of manufacture ensures cheapness of the finished product. Tanning is also a good line but there are now a large number of experts in the line in the country. It is good if you can specialise in artificial silk.

986 S R G., Rohtak—We published an article on Laundry in our March, 1933 issue. You may get laundry machine from W. Leslie & Co., 19, Chowringhee Road, Calcutta and Progress Engineering Co Ltd, 129, Meadows Street, Fort, Bombay. They can supply you details about the various operations in connection with steam laundry.

987 M. S., Bombay—Recipe of making duplicator or hectographs was published in January, 1934 issue of Industry.

990 S. A. G., Adoni—To manufacture catechu apply the following method:—Reduce heartwood to shavings and digest in 10 parts of water to 1 of wood for 2 hours. The decoction is made of 8° to 10° Beaume and is separated from the chips. The decoction is allowed to settle and to cool when small crystals of catechu are deposited. Separate these by filtration from the tan liquor. Finally dry the crystals in a warm place under shade. To make monople soap like the sample try with castor oil and coconut oil. Take 1 part castor oil, 4 parts coconut oil, 1 part caustic potash, water q.s. Add scarlet red as a dye.

991 A. C. G., Ranchi—To make patizarda proceed as given in the book and finally have it coloured by soaking it in a solution of red or yellow aniline dye as desired.

993 D. J. S., Udumalpet—Cotton is quoted in pence per lb. in the London market and cent per lb. in the New York market. In India cotton is quoted in rupees per candy. London—New York Cross rate is the exchange quotation between England and America and states the number of dollars and cents available in ex-



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change for 1 pound sterling. Ginning percentage states the amount of seeds embedded in 100 parts of cotton. Staple cotton is any cotton measuring $\frac{3}{4}$ " or over in staple. Count is a term to measure the fineness of the yarn. It may be defined as the number of yards of yarn which weigh 1/840 lbs. avoirdupois. In Broach the unit of sale of cotton is per candy of 885½ lbs; in Bombay it is 784 lbs. For daily quotations you have to arrange with cotton brokers at those places. Simple calculation of market prices will show you whether it is more profitable to sell kappas or cotton and seeds, separately. In this calculation the most of ginning and the selling prices of cotton and cotton seeds is to be taken into consideration.

995 S. B. E. Patna—A dark grey coloured powder is obtained by exposing metallic arsenic to the air. Mixed with sweets, it may be used to kill flies. Other methods of exterminating flies will be found in Domestic Recipes published from this office. To repair rubber shoes and celluloid toys use special cements as suggested in Domestic Recipes.

996 S. N. K. Panitola—Vermilion is a red powder, called sindur, used by the Hindu womenfolk on their forehead at the parting of hair. This may be had of M. C. G. P. Works, 1A, Kapi Bagan Lane; Davenport Trading Co., 1, Kashi Ghosh Lane; both of Calcutta. Simple flavouring will not turn bazar tobacco into good cigarette tobacco. For tobacco scents and surti read Indian Tobacco and Its Preparations published from this Office. To preserve an extract use rectified spirit.

997 B. G. N. Nagpur—(1) Recipe of antiphlogestin appears elsewhere in this issue (2) For the preparation of liniments, etc. consult *Materia Medica*. It also appears elsewhere in this issue (3) Asbestos may be had of Beaver Geo. & Co., 87, Clive Street, Calcutta; and Sew Dayal Ramji Das, 130, Mechua Bazar Street, Calcutta. (4) Amrutangan is a balm for relieving pain. (5) For recipes of the various articles mentioned consult industrial book on special subjects. It is not possible to give recipes on all varieties of subjects in these columns. Please state the subjects you are most interested in and we shall try our best to furnish you with the recipe wanted (6) Tauri is a Hindi word. (7) For method of testing ghee see February 1933 issue.

998 R. C. C. Srinagar—For durries communicate with Ebrahimji Peerbhoy & Son, 144, Laxmidas Market, Sheikh Memon St., Bombay; Ramlal Ram Bhas, South Gate, Mirzapur; L. Kundan Lal Chumilal, Ambala.

999 S. P. R. Manjha—We do not think that extraction of plantain fibre will be a

profitable proposition in these days when artificial silk is so cheap. We would advise you to think of some other line.

1000 C. C. S. Shillong—For industrial books write to Chakraverty Chatterjee & Co., 15, College Square or to Book Co., 4/4A, College Square, Calcutta. Industry Office also publishes on Indian Perfumes etc. price Re. 1-8 only.

1001 K. L. D. G. Jamshedpur—Boot and shoe lace making machines may be had of Mr. With Korting, Barmen, Germany. As regards Indian address you may write to Shams Bros, Premnagar, Cawnpore.

1002 A. D. Barpeta—(1) For learning manufacture of shuttle cocks you should try to be an apprentice in a shuttle cock making factory. (2) You better consult Cotton Dyeing and Printing for cloth printing and dyeing thread. (3) In order to remove the defect of ink. (4) To enhance quick drying you may add methylated spirit.

1003 B. M. Simla—Wood can be easily bent by soaking it in boiling water for three to six hours, according to its dryness and thickness. It is then in condition for forcing into the required shape by strap and clamps. When got to position, it must be left for 24 hours or longer, and then another 48 hours must pass before any attempt is made to work it. Care should be taken to compress the inner curves rather than to stretch the outer ones. The first cut from the lower end of the tree gives the best kind of wood for bending; it should be straight-grained, young and not too fully seasoned. A simple bend can be made with a rigid iron frame shaped like a link from a chain or a thick plate or iron having a hole in it through which the piece of wood that has to be bent can be passed. The sides of the hole are bevelled off to soften the abruptness of a right angle, and the bends of the wood are then clamped down to its flat surface of the

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plate, and kept there till the suppleness and elasticity imparted by boiling has disappeared and the wood retains its altered shape.

1004 R. R. N., Mombasa—(1) An article on dry cell making appeared in May 1934 issue of Industry. If you go through the article you will get all the information required. (2) Process of coir rope manufacture will be found in Profitable Industries published from this Office. Coir rope making machine may be had of Indo-Japanese Commercial Museum, 135, Canning Street, Calcutta. (3) An article on shoe lace manufacture appeared in September 1932 issue of Industry. (4) An article on enamelled ware manufacture will be found in June 1935 issue of Industry. (5) Process of manufacturing school slates and slate pencils will be found in June 1935 issue of Industry.

1006 S. A., Ghatkopar—(1) Following is the process of manufacturing otto of hena: Put 4 oz. hena flowers into a wide-mouthed bottle; throw in 15 grs. benzoic acid and pour in 20 oz. clear sandal oil. Place in the sun for 16 days. Then filter through filter paper fitted in a funnel. Put the filtered oil again in the bottle and soak a fresh lot of 6 oz. flowers. Close the mouth and set aside for one month. Finally filter through filter paper and store in a stoppered phial. (2) A good formula of disinfecting fluid will be found in June 1935 issue of Industry. (3) Hindi equivalent of *symplocos racemosa* is lodhra. (4) Hindi equivalent of *cyperus rotundus* is korchhi-fhar. (5) Hindi equivalent of *pavonia odorata* is valo. (6) Hindi equivalent of *pandanus odoratissimus* is keora. (7) In perfuming brahmi oil you should use essences. (8) In order to improve the quality of antiphlogestic paste you should use good quality kaolin and increase the proportion of glycerine. (9) An article on starch manufacture will be found in June 1935 issue of Industry. (10) Process of manufacturing aniline dyes, involves higher technicalities which cannot be dealt within these pages.

1008 V. B., Melur—You may buy Indian produce during season time, store it and sell it out of season. If you carry on this business cautiously you will get remunerative return for the capital invested. It will not be advisable for you to start a sugar factory with Rs. 10,000

only. You may however start a printing press if you are sure that you can secure sufficient work. You may start celluloid goods manufacture, shoe lace, pins and clips manufacture.

1011 N. C., Kohat—We are not aware of such a book.

1013 M. R. K., Hyderabad—Process of manufacturing whitening and white cement will appear in an early issue of Industry.

1016 A. B. T. W. C., Mymensingh—For preserving decoction you may add alcohol. One dram per bottle of decoction will be a sufficient amount. Process of refining sugar will appear in an early issue of Industry.

1017 D. G., Madras—Your enquiry appears in Trade Enquiry columns.

1018 D. V. S. M., Cocanada—Canning and Preserving by Dr. S. K. Mitra may be had of Thacker Spink & Co. (India) Ltd., 3, Esplanade East, Calcutta.

1019 V. K. A. R., Rajahmundry—Crucibles may be had of Francis Klein 1, Royal Exchange Place Calcutta.

1020 N. S., Hingoli—(1) For old newspapers and magazines write to Madras News Agency, 183, Mount Road, Madras; Premier News Agency, Nagercoil, S. Travancore, and Excelcior News Agency, Vizianagram City. (2) For fruit essence powder write to Paradise Perfumery House, 5, Colootola Street, Calcutta. (3) Commercial Education is published, from Post Box 2020, Calcutta; Indian Trade Journal, Civil Lines, Delhi; Übersée Post, 1, Salomonstrasse, Leipzig, Germany; German Exporter, Berlin-Charlottenburg 2, Germany; American Exporter, Johnston Export, Publishing Co., 370, Seventh Avenue, New York City, U. S. A.; Commercial Osaka, Osaka Commercial Museum, Osaka, Japan. (4) Cyclostyle press may be had of Roneo Ltd., 9, Clive Street, Calcutta. (5) Formulas you require will appear in an early issue of Industry.

1021 M. L. K., Amritsar—Collapsible tin cans, ink bottles, etc. may be had of Shah & Co., 55, Ezra Street, Calcutta.

1024 C. K. C., Jhajha—For starting a paper factory you have to invest at least Rs. 50,000. An article on paper manufacture will appear in an early issue of Industry.

1025 H. C. K., Calcutta—(1) Process of making sealing wax will be found in August 1934 issue of Industry, and also appears elsewhere in this issue. (2) Process of making wax cloth will appear in an early issue of Industry.

1028 H. D., Shikarpur—You may prepare sulphonated olive oil at home by adding sulphuric acid to olive oil.

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1029 D. S., Gohana—(1) You may add up to 5 p.c. common salt as filling agent. (2) In making lye of pearl ash add water slowly and measure the strength of the lye with a hydrometer. (3) The same process should be followed in case of making silicate solution. (4) A formula of washing soap will be found in December 1934 issue of Industry. Mr. R. Ghose of 8 Kripianath Lane, Calcutta can also furnish you with valuable practical formulas and instruction, as the result of his long experience in the line.

1031 S. S. H., Peshawar City—Kerosine oil may be made odourless by shaking it first with 200 grains of chlorinated lime for over 9 litres, adding a little hydrochloric acid, then transferring the liquid to a vessel containing lime, and again shaking until the chlorine is removed. After allowing the materials to subside the clear kerosine oil is decanted and stored.

1032 B. M., Raipur—Deal wood planks may be had of Belaghata Box & Timber Co., 8, Chaulpatty Road, Belaghata, Calcutta. You may use citronella oil to bar soap.

1033 R. B., Simla—Firms referred to by you have stopped their business. Home printing press may be had of Small Machinery Manufacturing Co. 22, R. G. Kar Road and W. H. Sellar, 14, Clive Street; both of Calcutta.

1034 M. M. B., Qilasheikhupur—Sodium sulphate may be had of B. K. Paul & Co., Ltd., 1 & 3, Bonfields Lane, Calcutta.

1035 S. N. S., Patna—(1 & 2) Addresses you require will be found in Thacker's Indian Directory published by Thacker Spink & Co. (India) Ltd, 3, Esplanade East, Calcutta. (3) As far as we know there is no restriction in sending circulars and handbills. (4) You better consult a lawyer.

1036 R. N., Ferozabad—(1) You may write to Yoshizumi Waichiro Shoten 31, Bakuromachi 5-Chome, Higashi-ku, Osaka, Japan. (2) Thin glass plates may be had of Behary Lal Dey, 9, Swallow Lane, Calcutta; Fotie Lall Seal & Sons, 10, Swallow Lane Calcutta; T. Komai Ltd. 24, Hikibuncho, Nishinari-ku, Osaka,

Japan and Harada. Shoji Kaisha Ltd., 9, Andojibashidori, 3 Chome, Minami-ku, Osaka, Japan

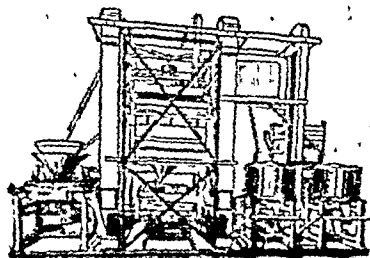
1037 K. C. J., Cawnpore—Following is a list of books on pigeon: Pigeon Keeping by E. S. Delamer; Pigeon Keeping for Amateurs and Book of Pigeon by R. Fulton. For the above books you may write to W. Newman & Co., Ltd., 3 & 4, Old Court House Street, Calcutta. (2) Wants to be put in touch with suppliers of gold fish.

1038 V. G. S., Ruwanwella—Tannic acid, grape oil, etc. may be had of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta.

1040 K. R. M., Lahore—(1) You may consult the following journals: British Trade Review, 113-115-117, Caveron Street, London E. C. 4; Commercial America, The Philadelphia, Commercial Museum, 34th. Street, below Spruce Philadelphia, U. S. A.; The Empire Mail, 212, High Holborn, London W. C. 1; Dun's International Review, The Mercantile Agency, 290, Broadway, New York, U. S. A.; American Exporter, published by Johnston Export Publishing Co., 370, Seventh Avenue, New York City, U.S.A. and Commercial Osaka published by The Osaka Commercial Museum, Osaka, Japan. (2) Formulas you require, will appear in an early issue of Industry.

1042 S. A. M., Rangpur—(1) Pancreatic solution is obtained by macerating for seven days 250 grms. of pancreas freed from fat and triturated with washed sand or pumice stone in 250 mulls of alcohol (90 p. c.), 200 mulls of glycerine and water g.s. to make 1000 mulls. (2) We cannot vouchsafe opinion, regarding foreign premium bonds.

1043 C. B., Uravakonda—(1) Dyes may be had of Fuzlehussain & Bros., 44, Armenian Street; Haverro Trading Co, 15, Clive Street and Volabhji Vanmali, 22, Armenian Street; all of Calcutta. (2) Chemicals may be had of B. K. Paul & Co Ltd., 1 & 3, Bonfields Lane, and Bengal Chemical & Pharmaceutical Works Ltd., 51, Chittaranjan Avenue; both of Calcutta. (3) For handlooms write to Bros. Partner & Co, 7,



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Ezra Street, Calcutta and Handloom Weaving Supply Co., Serampore, Hooghly.

1044 K. C. I., Bhimber—We have not heard anything about bentonite. You better have it analysed by an analytical chemist.

1046 L. P. E. P. W., Delhi—(1) For enamel paint write to Barry & Co., 2, Fairlie Place, Calcutta; Don Watson & Co., 8, Lyons Range, Calcutta and Jenson & Nicholson (India) Ltd., 2, Fairly Place, Calcutta. (2) Transfer picture for pottery is not manufactured in India at present.

1047 D. P. C. C., Rangoon—Process of making office paste will be found in February 1935 issue of Industry.

1049 K. C. A. S. D. N., Sivakasi—You may use adhesive paste for pasting labels on tins. But the tin can should be cleaned well, and grease and oil should be removed thoroughly. Following is a recipe of adhesive paste. Wheat flour 1 lb.; gum arabic 12 oz.; gum tragacanth 3 oz.; salicylic acid $\frac{1}{2}$ oz.; oil of cloves $\frac{1}{2}$ oz.; water $1\frac{1}{2}$ gallons. Heat the water, then dissolve the gums in part of it. Make a batter of the flour with another portion of the water. Stir well and mix with the gum water; then add water to the acid and cloves dissolved in water and just bring to the boil together and strain while hot.

1051 G. M., Bombay—(1) Dissolve glycerine in alcohol and mix this solution with the oil. Shake constantly to mix thoroughly. (2) To make oil heavier than water you should increase the specific gravity of oil. You should mix something oil-soluble with the oil.

1053 G. T. C., Bombay—Process of making citric acid from tobacco will appear in an early issue of Industry.

1054 S. N. K., Multan City—(1) It is extremely difficult to give any precise directions,

for the treatment of various stains, likely to be met with since the method to be employed depends not only on the nature of the stain, but also on the nature and colour of the fabric on which the stain occurs. However in the case of ink stains potassium permanganate followed either by sulphurous acid or hydrogen peroxide may be conveniently employed. For removing iron stains a solution of oxalic acid (upto 10 p.c.) containing a little sulphurous acid may be used. For removing fruit juice stains peroxide of hydrogen may be used. Process of gilding will appear in an early issue of Industry.

1056 P. I. H., Rawalpindi—Formulas you require will appear in an early issue of Industry.

1057 M. K. K., Kunnankulam—(1) For book binding cloth write to Islamia Book Binding Materials Trading Co., 100, Bathakkhana Road, Calcutta. (2) Other processes you require will appear in an early issue of Industry.

1059 B. S. K., Mahbubnagar—There is no tailoring institute which is recognised by the Government. Following is a list of tailoring institutes: Rao's Tailoring College, Sayce Bhuvan, Princess Street, Bombay; Deshabandhu Tailoring Academy, 15, College Square, Calcutta; Industrial Training House, 34, Bow Bazar Street, and Free Commercial College, 43, Bow Bazar Street; last three of Calcutta.

1062 I. L. F., Aligarh—For introducing coupon system issue one coupon to buyer of each lock. Print on the coupon upto what date the coupon will remain valid. Then arrange prize according to number of coupons presented to you. Fix a minimum number of coupons for which prizes will be awarded.

1063 K. B., Kund—For mixing and kneading machine write to W. J. Alcock & Co., 7, Hastings Street, Calcutta.

1065 S. R., Allahabad—Your letter has already been replied by post.

1067 G. S. S., Ludhiana—(1) For pushing sale of hosiery goods you may select the hill stations first such as Simla, Darjeeling, Missourie, etc. (2) The Dyer is published by Heywood & Co. Ltd., Drury House, Russell Street, Drury Lane, London W.C.2.

1068 S. I. A., Sialkot—(1) Collect as many addresses as you can from different localities. Sort them according to provinces or cities and sell them. (2) You can collect addresses of educated gentlemen from the callendars of different universities. (3) Poultry farming is a profitable business. Prospects of a poultry farm have been discussed in Reader's Business Problem Section of May 1935 issue of Industry. Eggs of all varieties are sold at the same price. You may start a poultry farm with Rs. 5000. (4) Before taking agency you may actually experiment with the oil and see the result. (5)

S. H. Kelkar & Co.



36, Mangaldas Road,
Bombay No. 2.
Wholesale Importers and
Stockists of

Essential Oils, Aromatic
Chemicals, Synthetic Per-
fumes, Flower Ottos, Soap
Perfumes, Oil colours and
all sorts of Perfumery Raw
Materials required for Per-
fumes Soap Makers, Agar-
bathi Manufacturers, etc.,
etc.

Prices and other Particulars
on Application.

Following is a recipe of dental cream: White castile soap 14 oz.; precipitated chalk 14 oz.; orris root 14 oz.; oil of peppermint 7 drams; oil of cloves 4 drams; water sufficient quantity. Dissolve the soap in water and triturate the chalk and orris root in the essential oils. Finally mix the two together and make into a cream paste. (6) Following is the process of making vinegar: Acetic acid 4 lbs, molasses 1 gallon. Put the ingredients together into a cask of about 40 gallons capacity. Fill with rain water shake it up and let it stand from one to three weeks, and the result is a good vinegar. (7) If you have to manufacture envelopes on commercial scale you have to invest Rs. 10,000.

1069 V. B. S., Jullundur Cantt—Picture post cards may be had of Calcutta Commercial Bureau, Kalighat, Calcutta.

1070 R. B. B., Sheikhpura—Urdu equivalent of silk cotton (kapok) is not known.

1071 S. S. B. S., Amritsar—You may use metal polish, a formula of which follows: Japan wax 100 parts; raw oleic acid 550 parts; melt together and mix with infusorial earth 350 parts, mirbane oil 2 parts.

1072 S. L. S., Lahore—Imitation jewellery may be had of M. Lilaram & Co., A4, New Market, Calcutta; Hiralal Nandlal Khetry, 154, Ashutosh Mukherjee Road, Calcutta; Himat & Co., Rampart Row, Karachi; Nagindas Laloo-bhai & Sons, Palanpur Bldgs., Dhanji Street, Bombay, and Pohoomull Bros, Radio House, Apollo Bunder, Bombay.

1078 M. V. S. B., Ellore—Wants to be put in touch with dealers in glass cement. Process of preparing glass cement will appear in an early issue of Industry.

1079 U. K. S., Thazi—We are not aware of any such instrument.

1080 S. G. I., Zahedan—(1) Glass bottles are manufactured by Bengal Glass Works Ltd, Church Road, Dum Dum, near Calcutta; Bharat Glass Works, 107, Dum Dum Road, Calcutta and Calcutta Glass & Silicate Works Ltd, 6B, Kundu Lane, Belgachia, Calcutta. (2) Japanese goods may be had of Oachell Molla & Co. Ltd., Dharamtala Street, Calcutta, and Mitsuibishi Shoji Kaisha Ltd, 135, Canning Street, Calcutta.

1083 B. N. G., Dera Ghazi Khan—You may consult Industrial Chemistry by G. Martin to be had of Chakravorty Chatterjee & Co. Ltd, 15, College Square, Calcutta, and D. B. Taraporevala Sons & Co., Kitab Mahal, Hornby Road, Bombay. There is no such industrial institute in India.

1085 N. L. N., Bhagalpur—We have no such book. You may however consult Practical Dry Cleaner, Scourer and Garment Dyer by William T. Brannet.

1086 J. S. K., Shikarpur—You may consult Kelly's World Directory published from 86, Strand, London W.C.1.

1087 M. J. M., Zanibar—(1) There is no appreciable difference between alcohol and spirit (2) You may add bees wax to brilliantine.

1091 D. S., Bombay—(1) Elastics are manufactured by Elastics Handelsgesellschaft m. b. H, 3, Passauer Strasse, Berlin W 50, Germany.

1092 J. P. H., Gonda—You may consult Petroleum Refining by A. Campbell to be had of W. & G. Foyle Ltd., Charing Cross Road, London W.C.2.

1093 A. S., Simla Hills—(1) You may consult Vegetable Oil Industry published from this office. (2) Address of oil mills will be found in Directory of Indian Industries published from this office, the price being 4 annas only.

1094 P. S. K., Wazirabad—Waxes may be had of Calcutta Chemical Co. Ltd, 35/1, Panditha Road, Ballygunj, Calcutta.

1097 M. F., No address—(1) The recipe is of whooping cough. The medicine should not be given to a baby as this contains laudanum (a preparation of opium) as one of its ingredients. (2) First decorticate the black pepper i.e. remove the outer skin and powder it to impalpable powder. (3) Piecegoods may be had of Pannalal Sagarmull, 112, Cross Street; Sir Sarupchand Hukumchand, 30, Clive Street; both of Calcutta. (4) Watches may be had of Ch. Abrecht, D5, Clive Bldgs. Calcutta; East End Watch Co., 4, Radha Bazar Street, Calcutta and Limton Watch Co., 7-8, Radha Bazar Street; all of Calcutta. (5) Glass wares may be had of Satcowri Das, 196, Old China Bazar Street and Satya Charan Paul, 194, Old China Bazar Street; both of Calcutta. (6) You cannot use ordinary glass in a camera as a lens. (7) Fruit essences contain alcohol. (8) Vernacular equivalent of the ingredients you require is not known. (8) Formulas you require will appear in an early issue of Industry.

1098 G. R. S., Karachi—You better correspond with High Commissioner for India, India House, Aldwych, London W.C.2. You may also

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Manufacturing specialities in spare time. No experience or capital required. Write for details (enclosing stamp if possible) to—
LEAGUE OF PROSPERITY PLANNERS,
2B, 'Bela Road,' Delhi.

write to Consul General for Japan, 26-27, Dalhousie Square, Calcutta and Consul-General for Germany, 3, Lansdowne Road, Calcutta.

1099 H. B. Goalundo—(1) For books on agriculture and gardening write to Thacker Spink & Co (India) Ltd., 3, Esplanade East, Calcutta. (2) For jute weaving machine write to Greaves Cotton & Co. Ltd., 10, Clive Row, Calcutta, and Heatly & Gresham Ltd., 6, Waterloo Street, Calcutta. (3) An article on battery manufacture will be found in May 1934 issue of Industry. (4) You may use a Storage Battery for producing electric current on a small scale.

1100 M. C. Arni—(1) An article on cement manufacture appeared in June 1935 issue. (2) A good formula of liquid disinfectant also appears in this issue. (3) Other formulas you require will appear in an early issue of Industry.

1102 K. C. I. Bhimber—(1) There is no arrangement for chemical analysis in our office. You may however correspond with C. S. Marathe, P.O. Vile Parle, Bombay, and S. C. Sen, 6, Kirti Mitter Lane, Shambazar, Calcutta. (2) For selling Indian herbs and drugs write to Lukmanji Ebrahimjee, 65, Canning Street; V. Damodar (Calcutta) Ltd. 13, Ezra Street and H. C. Mehta & Bros., 10, Ezra Street; all of Calcutta.

1103 B. W. C. Bombay—Your name has been registered in our reference directory.

1104 K. J. S. Chanda—(1) No such dictionary is available. (2) We are not aware of the detail of Soap Training House of Saidpore. You should however write to the party direct for particulars. Mr. R. Ghose of 8, Kripa Nath Lane, Calcutta, who had been the expert and manager of an established soap factory in Calcutta for a long time is personally known to us; his knowledge in soap making is profound, and his training most successful. (3) There is no other Soap journal except the one issued by The All-India Soap Maker's Association. (4) You may go through Industry and our publications. (5) We are not aware of any soap training institute in C. P., U. P., Delhi and the Punjab. (6) Wants to be put in touch with the dealers in teak saw-mill waste and saw dust.

CHEMICALS

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Sugar, Soap, Toilets, Matches, Glass, Potteries Leather, Carpet Ink, Drybatteries, Photographs and for Dyeing and Bleaching Cotton, Wool, and Silk. Write to—
RASIKLAL & CO., Post Box 2228, Bombay 2.

1105 J. K. K., Madura—(1) Following is a formula of turpentine soap: Take 100 lbs. of talc made into a paste with weak solution of carbonate of potash and mix this with 100 lbs. of rosin grained soap by heat. When cool enough add 4 lbs. of turpentine and 3 lbs. of benzene. Finally mould as usual. (2) Soap having yellow colour and generally bar soap or tallow rosin soap is called yellow soap; the same rule applies to white and brown soap. A bar soap on age becomes brown. Dry soap is dried soap, powder or flake.

1106 S. V. R., Vizagapatam—(1) All the ingredients should be by weight. (2) You may use sodium carbonate as given in the recipe. (3) Vanillin is liquid which may be had of Paradise Perfumery House 75, Colootola Street, Calcutta.

1107 J. C. C., Thaton—(1) Rubber mixing machines may be had of W. J. Alcock & Co., 7, Hastings Street, Calcutta. (2) For thermometers write to Scientific Supplies Co., C36-38, College Street Market, Calcutta. (3) Formulas you require will appear in an early issue of Industry.

1108 G. D. C., Rawalpindi—(1) Envelope making and thread making machines may be had of Oriental Machinery Supply Agency Ltd. 20, Lall Bazar Street, Calcutta. (3) Biscuit making machines may be had of W. J. Alcock & Co., 7, Hastings Street, Calcutta. (4) Soap making machines may be had of J. Mayr, 1, Mission Row, Calcutta. (5) Vernacular equivalent of pennyroyal is not available. (6) Hindi equivalent of sesame oil is "Til-ka-tel." (7) No, we cannot supply you copies of articles which appeared in 1933 and 1934 volumes of Industry.

1109 S. C. B., Namrup—Cans for tooth power may be had of Shah & Co., 55, Ezra Street, Calcutta.

1111 D. K., Nasirabad—Process of making ice cream packets will appear in an early issue of Industry.

1113 M. A., Negapatam—(1) For improving quality of tobacco you may add tobacco extract. (2) Before making beedies dry the ingredients thoroughly in the sun. (3) Process of deodorising coconut oil will be found in March 1935 issue of Industry. (4) In deodorising gingelly oil you may also adopt the same process.

1114 S. S. M. C., Rawalpindi—(1) Sewing machines are manufactured by Eastern Sewing Machines Ltd., Mg. Agents, Mayor & Co., 25, Pollock Street, Calcutta. (2) Following is a list of sewing machine dealers: Davis Sewing Machine Co., Dayton, Ohio, U. S. A.; Standard Sewing Machine Co., Cleveland, Ohio, U. S. A.; Mundlos Aktien-Gesellschaft, Magdeburg, Germany; Hermann Palm Braunschweig, Germany;

Kocks Adlernähmaschinen-Werke A-G, Bielefeld, Germany; Austrian Sewing Machine Factory Ltd., Wien XVII/3; Austria and Haid & Nen, Karlsruhe, Baden, Germany. (3) Machine manufacturers make the parts and then adjust them properly. (4) Duty on sewing machine is 30 p.c. ad valorem; duty on typewriter is also 30 p.c. ad valorem. (5) Sewing machine needles may be had of Standard Sewing Machine Co., Cleveland, Ohio, U. S. A.; Semler, Siman, Pilsen, C. S. R. and Concordia-Ahlen-fabrik, Schmalkalden, 240, Thuringen, Germany.

1116 B. C. H., Arrah—(1) An article on rubber stamp making appeared in June 1934 issue of Industry. (2) For machineries required you may write to Adair Dutt & Co. Ltd, 5, Dalhousie Square, Calcutta. (3) For photographic materials write to Calcutta Photographic Stores & Agency Co., 154, Dharamtala Street, Calcutta. (4) I think cinema business will not be profitable in your town. However you may first try the business with machines hired from some dealers and take a rented house. If you find the business profitable you may purchase machines and build a house otherwise you have to undergo risk.

1118 B. S. S., Peshawar City—For learning tailoring you may go to Rao's Tailoring College, Sayce Bhuvan, Princess Street, Bombay and Deshabandhu Tailoring Academy, 15, College Square, Calcutta.

1119 R. P. S., Mayavaram—(1) We have no book on beekeeping. (2) Chemicals and fruit essences required may be had of Paradise Perfumery House, 75, Colootola Street, Calcutta and Butto Kristo Paul & Co. Ltd, 1 & 3, Bonfields Lane, Calcutta.

1121 Y. B., Ahmedabad—Creosote oil may be had of Bengal Chemical & Pharmaceutical Works Ltd, 31, Chittaranjan Avenue, Calcutta and Turner Morrison & Co. Ltd., 6, Lyons Range, Calcutta.

1122 M. L. S., Ambala City—(1) Following is a list of institutes coaching electroplating: Industrial Classes, Benares Hindu University, Benares; Strangers' All-India Railway Training Electrical Engineering and Art College, 21, Victoria Park, Benares City, The Central Polytechnic Institute Lashkar, Gwalior. (2) No machine is required for moulding gold and silver ornaments. You may use mould of required design. (3) You may consult Electroplating and Electro-refining of Metals by Watt & Philip. (4) You may start electroplating with a capital of Rs 3000. (5) An article on battery manufacture appeared in May 1934 issue of Industry. (6) No such dictionary is available.

1124 T. S. V. B., Muzaffarpur—Biscuits are manufactured by B. N. Biscuit Factory, Hatheebaug, Mazagaon, Bombay; Bengal Biscuit

Factory Ltd., 2, Bagmari Lane, Calcutta, Britannia Biscuit Co., Beerpara 1st Lane, Dum Dum, Calcutta, and P. Sett & Co., 3, Ramkanto Sen Lane, Ultadanga, Calcutta.

1125 T. M. L., Karachi—(1) Process of deodorising coconut oil will be found in the January and March 1935 issues of Industry. (2) Following is a recipe of scented coconut oil: Refined coconut oil 5 seers; balsam peru 2½ oz., fly cantharides 5 dr.; sandal oil 15 dr.; alkanet root 15 dr.; otto of hena 5 dr.; oil of rosemary 10 dr. First of all the oil is treated with alkanet root and allowed to remain undisturbed for 2 days for colouring. The fly cantharides are next fried in about 1 chhattak of fresh coconut oil and when these are well fried and discoloured, these are allowed to cool. Afterwards add the previously coloured oil and the balsam Peru after melting. Finally add the other ingredients one by one with constant shaking.

1126 M. B. M., Madras—Kerosene oil is imported by The Victor Oil Co. Ltd., 11, Clive Street, Calcutta and Phoenix Oil Co., 62, Muk-taram Babu Street, Calcutta.

1128 P. M. R. N., Coimbatore—Cycles are manufactured by Alldays' and Onions, Follow Road, Sparkbrook, Birmingham; B. S. A. Cycles Ltd, Birmingham; The James Cycle Co. Ltd, Gough Road, Greet, Birmingham, and New Hudson Ltd, Birmingham. (2) Cycle saddles are manufactured by J. B. Brooks & Co. Ltd, Great Charles Street, Birmingham, and National Saddle Works Ltd., 30, Charlotte Street, Birmingham.

1129 R. M. S., Bombay—Process of making cork mats and mattings will appear in an early issue of Industry.

1132 A. H., Guntur—(1) Dyes may be had of Fuzlehussein & Bros., 44, Armenian Street, Calcutta, and Fateh Chand Hiralall, 43, Armenian Street, Calcutta. (2) Chemicals may be had of Butto Kristo Paul & Co. Ltd, 1 & 3, Bonfields Lane, Calcutta. (3) Blocks may be

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Rampuria Chambers, 10, Clive Row, Calcutta.

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had of Bharat Chitralaya, 355, Upper Chitpur Road, Calcutta.

1134 N. K., Bombay—(1) You may mix any colour with the varnish. (2) Cement colour may be had at any paint shop.

1136 D. B., Calcutta—Process of stain removing appears elsewhere in this issue.

1137 P. S. V., Kymore—For cinema machine you may write to Adair Dutt & Co Ltd, 5, Dalhousie Square, Calcutta.

1139 A. C. S., Jammu—Process of manufacturing incense sticks will be found in December 1934 issue of Industry.

1140 P. N. G., Gaibandha—(1) Bengali type-writing machine may be had of Remington Rand Inc., 3, Council House Street, Calcutta.

1142 R. N., Karnal—You may start a celluloid factory for manufacturing soap cases, powder cases, comb, hair pins, etc. Ultimately you may also manufacture dolls and toys of celluloid.

1143 C. D., Simla—(1) Rebuilt or second-hand machines are not available. You better write to John Dickinson & Co. Ltd, Grosvenor House, 21, Old Court House Street, Calcutta (2) Watches, clocks, timepieces, etc., may be had of Fukusei Yoko, 16, Uchi Honmachi, Hashizumecho Higashi-ku, Osaka, Japan, and K. Hattori & Co. Ltd., 17, Bakuromachi, 4, Chome, Higashi-ku, Osaka, Japan.

1146 D. R. S., Mirpur—Reply to your query appeared in May and June 1935 issues of Industry.

1149 S. R. D. V. R., Tuni—Vernacular equivalents of the ingredients are not available. You may however try Banshidhar Dutt & Sons, 126, Khengrapatty, Barrabazar, Calcutta.

1151 E. M., Tura—Aluminium wire may be supplied by Johnson Richard and Nephew Ltd., Bradford Iron Works, Manchester.

1154 C. P. S., Bijoor—(1) As far as we know gypsum, and alabaster are not used in manufacturing white cement. (2) Following is a list of mineral merchants: Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane, Calcutta; India Minerals & Prospecting Co., 9, Dalhousie Square, Calcutta, and Oriental Minerals Syndicate, 16, Commercial Bldgs, Calcutta.

1155 P. P. A., Myohaung—(1) Tobacco pipes are made of amber, briar root, porcelain, meerschaum, etc. Following is the process of tobacco pipes: Amber pipe stems after being tooled out are bent to the required shape. They are first immersed in oil and heated until they lose much of their brittleness. Then they are held over a spirit flame and bent as desired. The threaded ends of the stem are protected while bending by an arbor screwed therein. The pipes are now carefully smoothed with pieces of American rush, or shave grass; the stem of the grass, owing to the natural deposit of silica, has a slight roughness which perfectly adapts it for this service. After the pipe stems have been properly finished with the rush, they are immersed in melted wax for a short time depending on the density of the amber and then they are given a high polish with precipitated chalk. (2) Sugar of lead may be had of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta. (3) Bicycles may be had of Bentinck Cycle Co., Chowringhee, Calcutta. (4) For engraving tools write to Subal Dutt & Sons, 39, Clive Street, Calcutta.

1157 M. D. B., Rajkot—Process of manufacturing slate pencils will be found in June 1935 issue of Industry. For slate pencil making machine write to W. J. Alcock & Co., 7, Hastings Street, Calcutta. Books you require may be had of Thacker Spink & Co., (India) Ltd., 3, Esplanade East, Calcutta, and D. B. Taraporevala Sons & Co., Taj Building, Hornby Road, Bombay.

1161 M. B., Gauhati—(1) For Cheque Writer write to Thacker Spink & Co. (India) Ltd., 8, Esplanade East, Calcutta. (2) Henleys Encyclopaedia of Formulas may be had of Standard Literature Co. Ltd., 13/1, Old Court House Street, Calcutta.

1162 S. D., Surat—For Japanese and German caustic soda write to Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane, Calcutta. Caustic soda is not manufactured in India at present.

1163 M. H. K., Jodhpur—(1) Manufacture of aniline dyes involves higher technicalities and requires services of special experts. You may however prepare natural colours. Blue: copper sulphate $\frac{1}{2}$ sr.; lemon juice $\frac{1}{2}$ dr. Mix together and wait for 4 hours. Then boil; remove when reduced to half. Dry and powder. Black: Ferrous sulphate 4 ch.; Brazil wood 4 ch. gall nut $\frac{1}{2}$ sr.; gum arabic 1 ch.; sugarcane vinegar 2 $\frac{1}{2}$ srs. Powder the first four ingredients mix and immerse them in the vinegar for 3 days. Then strain, keep in an iron pan, dry in the open and powder. Blue-black: Gallnut 2 srs.; ferrous sulphate 1 sr.; black catechu 2 ch.; gum 2 ch.; indigo 1 sr.; water 10 srs. Pound the gall nuts

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A radical cure for RING-WORM and all sorts of Skin diseases.

Price 1 oz. As. 0-6-0
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and put in an iron pan. Pour in warm water 10 srs. and set aside for 5 days. Set the pan over fire and when the liquid is reduced to half throw in the catechu. When only one fourth is left throw in the sulphate and afterwards gum. Take away when 1 sr. is left and set aside for a fortnight. After that strain and mix in the indigo; dry in the open and powder finely. Red: Brazil wood $\frac{1}{2}$ dr.; soda ash refined (finely powdered) 2 ch.; water $2\frac{1}{2}$ srs.; alum 1 tollah Bruise the wood and soak it with the soda ash in hot water for 6 hours. Then bring to boil. When half is left add the alum and continue boiling. Remove from fire when $\frac{1}{2}$ dr. is left. Finally dry and powder. Green—Annatto seed 1 sr., soda ash 2 ch.; water 4 srs.; turmeric 2 ch.; kamela powder 4 ch.; alum 1 ch., indigo 1 ch.; Bombay arrowroot 1 ch. First dissolve soda ash in 1 sr. water and steep annatto seeds in it for 6 hours. Then mash them thoroughly. Bring to boil 4 srs. of water and when ebullition occurs throw in turmeric and pour in the mashed annatto with liquid. Continue to boil; when the decoction is reduced to half, throw in kamela powder and stir in alum. Remove when only 1 sr. is left and strain. Add to the liquid country indigo and Bombay arrowroot. Dry in the open and powder. (2) Process of making all kinds of ink will be found in Manufacture of Ink published from this Office

1164 B. K. D., Agra—You may set oil ghan-nies and run them with the motor.

1165 A. Q., Tonk-raj—No such engineering institution is known to us. Unless you pass the Matriculation examination you cannot join an engineering institution.

1166 D. G., Madras—Novelties may be supplied by Amano Shoten, Bakuromachi 2-Chome, Higashi-ku, Osaka, Japan, and Hashizume Yoko, 65, Kobaicho, Kitaku, Osaka, Japan.

1169 C. C., Sialkot City—Refer your query to The Indian Trade Commissioner, India House, Aldwych, London W. C. 2.

1175 G. S. S., Ludhiana—(1) It is not possible to refine gold without cutting into thin pieces. Process of refining silver will appear in an early issue of Industry.

1176 M. H., Pondicherry—(1) A formula of cheap washing soap will be found in December 1934, issue of Industry. Wants to be put in touch with suppliers of mohua and palm oil, soap making machinery and soap dies in Madras. Lard may be had of Varadasheti Lard Factory, Triplicane, Madras. Palm oil may be supplied by Calcutta Chemical Co. Ltd., Panditia Rd., Balligunje, Calcutta. Mohua oil may be supplied by Mohin & Co., 10, Beadon Row, Calcutta.

1177 W. A. F., Marawila—One seer is equal to eighty tollas; one chhiatak is equal to 5 tollas

and 1 poa is $\frac{1}{4}$ seer or 4 chhiatak or 20 tollas. One seer is also equal to about 2 lbs.

1178 M. V. K. A. S., Kumbakonam—The address of Mitsui Bussan Kaisha & Co. Ltd. is 100, Clive Street, Calcutta.

1179 S. R. S. S., Amritsar—First put the oil then pour in the water, boil for some time, remove from fire when oil will float on the surface. Now decant the oil carefully.

1180 B. B. K. G., Kansara—We are not aware of the address.

1181 W. C. S. S., Dacca—(1) Flour may be had of Kassim & Ismael, 5/2, Garstin Place, Calcutta. (2) Coconut oil may be had of Jengendra Nath Sen, 242/2, Upper Circular Road, Calcutta. (3) Wire may be had of Gopal Chandra Das & Co. Ltd., 86A, Clive Street, Calcutta. (4) Cast iron pans may be had of Girindra Mohan Lkshminarayan Biswas, Silpatty, Barrabazar, Calcutta. (5) Cumin Seed may be had of Madhab Chandra Daw, 4, Armenian Street, Calcutta. (5) Cumin seed may be had of T. C. P. A. Yela Sarakku Virpanal Co. Ltd., 8B, Amratolla Street, Calcutta. (7) Bucket may be had of Bengal Gakanising Works, 91A, Ultadanga Main Road, Calcutta, and Madan Mohan & Co., 55/1, College Street, Calcutta. (8) Sugar may be had of Balikram Kissen Chand, 118, Cross Street, Calcutta, and Haribux Doorga Prasad, 61, Cross Street, Calcutta.

1182 K. C. G., Aligarh—You may use spirit chloroform in place of ordinary spirit. Formulae you require will appear in an early issue of Industry.

1184 K. K., Rawalpindi—Formula of phul-huri, magic snake, etc., will appear in an early issue of Industry.

1185 D. C., Dhanbad—Emery paper making machines may be had of P. N. Dutt, 3A, Raja Kalkissen Street, Calcutta. The above firm will supply with an estimate for starting a factory.

1186 D. G., Madras—You may consult Osaka Index published by the Osaka Commercial Museum Osaka, Japan.

1188 J. S. N., Birlapur—(1) Dealer of umbrella materials of Japan is K. Araki & Co., 1, Utsubo Nakadori 1, Chome, Nishiku, Osaka; that

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That, Paris Gold, the Scientifically made Imitation Gold in solid Bars like Pure Gold, is sold only @ Rs 6 per oz (2½ Tollas); Rs. 10 for Two ozs., and Rs 64 per lb. Mainly used with Pure Gold to cheapen its high cost—retaining it Acid Proof. Guaranteed Satisfaction or Money-Back. Better, order now for an oz. or Two of Paris Gold, before you are fully convinced to place a Big Order. Wanted Agents.

HOUSE OF COMMERCE,
Ulubari Road, Gauhati, 34.

1207 P. N. G., Dantan—Photographic camera is manufactured by Welling Camera House, Belgaum, Bombay.

1212 T. G. S. P., Negapatam—Electrical goods may be had of Commercial Electric Co., 63, Ezra Street, Calcutta; Electric Trading Co., 54, Ezra Street, Calcutta and B. M. Singh & Son, 43, Chattawalla Galli, Calcutta.

1214 S. S., Bangalore City—Process of making agarbattis will be found in December 1934 issue of Industry under the caption of incense stick.

1215 N. S. I., Palghat—(1) You may consult Pre-cast Concrete Factory Operation by H. L. Childe and Concrete Products and Cast Stone by the same author. (2) You may consult Manufacture of Earthenware by E. A. Sandeman, and Ceramic Industries Pocket Book by A. B. Searle. (4) For toy making you may consult Toy Manufacture by J. T. Mackinson. All the books may be had of W. & G. Foyle Ltd., Charing Cross Road, London W. C. 2.

1216 Anonymous, Amritsar—(1) For teak wood write to U. Aye Maung, 511, Vinton Street, Kemmendine, Rangoon. (2) For machines write to Krupp Indian Trading Co. Ltd., 29, Strand Road, Calcutta. (3) For securing an expert advertise in daily papers.

1218 L. Y., Mirpurkhas—(1) Formula of good washing soap will be found in December 1934 issue of Industry. You may also refer to R. Ghose soap expert, 8, Kripanath Lane, Calcutta. (2) Process of deodorising coconut oil will be found in March 1935 issue of Industry.

1220 R. S., Ambala—Following is a list of institutes where training is given in motor engineering and driving: School of Motoring, 12/1, Government Place East, Calcutta, and F. M. C. School of Motoring, 243-3, Lower Circular Road, Calcutta.

1221 O. P. V., Seoni—Soap making machines may be had of J. Mayr, 1, Mission Row; W. J. Alcock & Co., 7, Hastings Street and Small Machinery Manufacturing Co., 22, R. G. Kar Road; all of Calcutta.

1224 J. N. V., Talegaon—To communicate with any querist write to him with number and initial under care of Industry. Your letters will be redirected to the party, the full address having been supplemented by us. (2) Want to buy a fishing net knitting machine.

1225 M. R. D., Rangoon—Following is a recipe of black varnish: Shellac 8 parts; rosin 5 parts; lamp black 1 part; methylated spirit 32, parts

1226 D. B., Billimora—If you want to manufacture essences for cold drinks you should consult the following books: Indian Perfumes, Essences and Hair Oils, price Re. 1/8 only, published from this Office. The Chemistry of Essential Oils by H. Finemore price 70s. net. to be had of W. & G. Foyle Ltd, Charing Cross Road, London, W. C. 2.

1227 P. N. D., Ahmedabad—Machinery for manufacturing crucibles may be supplied by Werned & Pfeiderer, Saginaw, Mich. America. The materials may be supplied by American Vittrified Products Co., Akron, Ohio. U. S. A.; Hammill & Gillespie, New York, U. S. A., Calcutta Mineral Supply Co Ltd, 31, Jackson Lane, Calcutta.

1228 G. D. C., Rawalpindi City—(1) Yes cinematography seems to be very prospective as its demand and popularity are increasing rapidly (2) There is no facility for learning this art in India nor are we aware of any foreign institute where students are trained in cinematography. Radio Talkie Institute, 249 B, Bowbazar St., Calcutta is said to train students in this art. You may enquire of American Trade Commissioner 10, Clive Street, Calcutta and High Commissioner for India, India House, Aldwych London W. C. England regarding foreign address of cinema school, if any. (3) Try to get yourself as an apprentice in some studio. (4) A successful cinematographer has immense scope of earning. (5) It is not known whether any trained man in this line is unemployed or not (6) The sole agent of Panama blade is L. H. Emeny, Mercantile Bldgs, Lal Bazar, Calcutta. That of Minerva blade is not known. Please negotiate with the party direct for sub-agency, which you may get.

JONES'

Family and Medium, Hand,
Treadle & Electric High-class,
English Made.

SEWING MACHINES

VOL XXVI. No. 304.

For every description of sewing, ruffling, tucking, hemming (all widths), darning, braiding, quilting, on the finest silks or heaviest cloth are the simplest, swiftest, lightest running, most durable and cheapest in the market.

For particular apply to:

DON, WATSON & CO.,

19, British Indian Street, Calcutta.

1229 M. A. S. & C, Quetta—For electroplating purposes, 1 Ampere Current will do.

1230 J. V. C, Hyderabad, Sind—Refer your query to General Electric Co. (India) Ltd., Magnet House, Central Avenue (South) P. O. Box No 2329, Calcutta

1231 K. J. R, Macherla—(1) We are not aware of the industrial use of the stones sent by you, nor can we recognise what they are. You may consult a jeweller as well as a chemical analyser. (2) Wants to be put in touch with buyers of rock crystal.

1232 U. B. U. C, Bally—(1) It is milk sugar, and not cane sugar which is used with Homeopathic medicine as vehicle. The method of manufacturing sugar of milk appeared in July 1934 issue of Industry. (2) The following is a recipe of high class chocolate: Take 2 lbs. each of roasted and ground cocoa and pulverised sugar, and $\frac{1}{2}$ oz. of powdered cinnamon. First intimately mix the cocoa with a corresponding quantity of sugar and the other ingredient in a mixing boiler, consisting of a round trough of granite provided with a mixing apparatus. Then divide the warm soft mixture into lumps of a determined weight and place in tin moulds upon a shaking table. The soft mass by this motion, spreads out uniformly in the moulds, and the air bubbles enclosed in it escape. The chocolate in cooling off contracts and detaches itself from the sides of the mould. Good chocolate forms a brown homogeneous mass of great density. The surface of the cake should have a dull lustre, and when broken, the fracture must be sharp and show no lustrous or white granules. The machinery may be had of Marshall Sons & Co. Ltd., 99, Clive Street, Calcutta. (3) The following are vegetable seed dealers:—Austin & Meslan, 91-95, Mitchell Street, Glasgow, England; Bees Ltd., 175-181, Mill Street, Liverpool, England; W. Allee Burpee & Co, Philadelphia, Pa, America. (4) Yes, mosquito incense coil like the Chinese may be prepared in India. The following is a good formula of mosquito Pastilles:—Powdered charcoal 16 parts, Nitre 2 parts, Gum Benzoin 4 parts, Hard tolu balsam 2 parts, Insect Powder 4 parts, Tragacanth Mucilage a suffi-

ciency. Powder the solids in a mortar, make into a stiff paste with the mucilage, and form into cones or spirals of desired weight.

1233 S. T. K., Old Sukkur—The formulas of Magic Wire and Paraffin Candles will appear in an early issue of Industry.

1234 S. S. S., Lahore—(1) You should better put your pickles into tin cans instead of glass bottles which are brittle and liable to damage. The air of the can may be extracted with the help of a vacuum pump. You may also pasteurise the pickles by heating the bottles or can, and immediately corking and sealing with wax. (2) The formula of a good cream for the face appeared in September 1934 issue of Industry. (3) Bottles may be supplied by Maher Singh Sapuran Singh Chawla, The Mall, Lahore; Abdul Rahim & Sons, Elphinstone Street, Karachi. (4) To secure agency please advertise in papers. (5) The book you speak of may be reviewed in our journal if sent to this office but we cannot publish the same.

1236 M. R. O., Sind—Hamamelis water is a non-official preparation of a herb called hamamelis or witch-hazel. United States Pharmacopoeia name of this is Aqua Hamamelis. It may be had of B. K. Paul & Co, 1 & 3, Bonfields Lane, Calcutta. If this is not available you may take for it Liquor Hamamelidis (B. P.) to the same quantity. It is added to the snow by ordinary mixing.

1241 S. I. A., Gujranwala—Yes, you can manufacture lipstick and sell in the market. While experimenting cost will be rather higher. Price should be fixed according to actual cost prices. For mould write to P. N. Dutt, 3A, Raja Kalikissen Lane, Grey Street, Calcutta

1243. V. S. K., Salem—You may use white oil as an adulterant.

1244 M. T. N. R., Adoni—(1) For selling soap stone you may negotiate with Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane, Calcutta. (2) An article on cement manufacture will be found in June 1935 issue of Industry. (3) Soap stone cannot be utilised in manufacturing cement.

1245 A. H., Trichur—(1) Following is a recipe of label gum:—Gum arabic 12 grams; gum tragacanth 3 grams; water 60 grams; thymol 0.10 gram; glycerine 12 grams. Dissolve the gums in the water, strain through cloth then add the thymol previously mixed with the glycerine and enough water to make the whole weigh 120 grams. (2) For the book enquire of Chakravorty Chatterjee & Co. Ltd., 15, College Square, Calcutta. (3) Wants to be put in touch with dealers in cotton seeds; and chaulmoogra seeds.

G. Dey & Co.,

Suppliers of Stationery to the Government of India and Corporation of Calcutta, etc. Rubber Stamp Makers, Die-Sinkers, etc. etc. General Order Suppliers. Quote for your esteemed enquiries and hope we shall be able to please you.

13, Satrugna Ghose Lane, Calcutta.
Telephone—B. B. 1735.

1255 A. K. G., Calcutta—(1) Tyres are made of vulcanised rubber. (2) It is not possible to extract raw rubber from vulcanised rubber. (3) Caoutchouc is raw rubber.

1256 G. R. C., Kulitalai—Prices of articles fluctuate according to demand and supply. If the demand for a certain thing is high but the supply is meagre the prices of that article is sure to rise. Dyes may be had of Haverro Trading Co., 15, Clive Street, Calcutta; Fatehchand Hazarimull & Co., 2/1, Armenian Street Calcutta; Adamjee Bhaice Rangwalla, 396, Katha Bazar, Bombay; Hansraj Vishram & Co., 112, Nainiappa Naick Street, P. T. Madras and H. J. Ratanji & Co., 69, Cowasji Patel Street, Fort, Bombay.

1257 P. K. Ajmer—We are not aware of sand watches. You may however enquire of Consul-General for Germany, 3, Lansdowne Road, Calcutta, and Consul-General for Japan, 26-27, Dalhousie Square, Calcutta.

1259 U. B. G. C., Mandalay—For tin cans write to Metal Box Co. of India Ltd. B2, Hide Road, Kidderpore, Calcutta.

1260 R. C. S., Dalgaon—(1) For selling fibre overseas write to Indian Trade Commissioner, India House, Aldwych, London W.C. (2) No such directory is available.

1263 V. S., Bellary—(1) Embossed printing machine may be had of John Dickinson & Co Ltd., Grosvenor House, 21, Old Court House Street, Calcutta. (2) No such thing is known to us. (3) You may use bronze powder and varnish for golden colour. (4) You simply apply the enamel paint on the body with a brush. (5) Wants to be put in touch with the suppliers of secondhand cameras for block making. (6) Process of sensitising glass will appear in an early issue of Industry. (7) In case of water colour dissolve it in water and in case of oil colour dissolve it in oil. (8) No substitute for dragon blood is known. (9) Other processes you require will appear in an early issue of Industry.

1265 S. N. C. B., Palghat—(1) Process of refining castor oil for medicinal use will be found in November 1933 issue of Industry. (2)

First make a concentrated infusion of coffee. Dry it in the sun. Then make tablets out of it.

1268 J. N. T., Shukarpur—For small jute mincing machine write to Oriental Machinery Supply Co. Ltd., 20, Lall Bazar Street, Calcutta

1269 K. U., Rampur State—Talkie equipment may be had of Bombay Radio Co. Ltd., Queen's Road, Opp. Marine Lines Station, Bombay, and Continental Talkie Equipment Corporation, Movietone, Fort, Bombay. For particulars write to the parties direct.

1271 S. C. B. C., Mankachar—(1) For German balance and weights write to Adair Dutt & Co. Ltd., 5, Dalhousie Square, Calcutta. (2) For vernacular books write to Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta. (3) No such list is available. (4) Refer your query to the Director of Agriculture, Ramna, Dacca. (5) To organise lottery you better consult a lawyer to ascertain its legality. (6) Empty match boxes have no demand in the market. (7) For selling broken glasses you may communicate with glass manufacturers. (8) For handpower small industrial machines write to Oriental Machinery Supplying Agency Ltd., 20, Lall Bazar Street, Calcutta. (9) Wire-netting may be had of Indian Wire Netting Factory, 24, Sastitola Road, Narkeldanga, Calcutta. (10) Cream separator may be had of S. B. Dairy & Co., Dinapore Cantt.

1272 J. D. K., Lahore—Tin box making machines may be supplied by E. W. Bliss Co., Brooklyn, New York, U. S. A. and L. Schuler A. G., Goppingen, Germany. The above firms will supply with an estimate for starting a factory. Demand for tin containers is increasing day by day.

1276 H. D. M., Jind State—(1) Papaya should not be plucked from the tree for making incision. (2) For selling papain you should communicate with B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane and Bengal Chemical & Pharmaceutical Works Ltd., 31, Chittaranjan Avenue: both of Calcutta.

1278 P. N. R., Pudukotah—Tin can making machines may be had of Francis Klein, 1, Royal Exchange Place, Calcutta

1280 G. B. D., Gondia—(1) Chemicals you require may be had of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta. (2) Dyes may be had of Fuzlehussein & Bros., 44, Armenian St., Calcutta. You may consult Inks: Their Composition and Manufacture by C. A. Mitchell and T. C. Hepworth.

1285 J. K. K. I., Madura—As far as we know potato is imported into India only from Burma.

DRINK

Mallick's Tea

(Satisfaction Guaranteed)
WANTED AGENTS.

Apply to—

MALLICK TEA CO.,
102/1, Clive Street, Calcutta.

OMEGA WATCHES.

The last report of watch trials held at the National Physical Laboratory is of special interest, because the watch that headed the list obtained the highest total mark ever awarded (97.4). This was an Omega desk watch with a Guillaume balance, and not only did an Omega watch obtain the first position, but out of the first twelve watches, no less than nine were from the Omega factory. It is evident, therefore, that this organisation must have the facilities for producing watches of the highest order of perfection.

As a matter of fact the factory has been in existence since 1848, and the first Omega watch was produced in 1894, and ever since that date advantage has been taken of any scientific advancement that would lead to improvements.

Every operation is scientifically tested, and without visiting the works it is difficult to appreciate the exacting care that is taken in the manufacture. Certain features in the design and finish can, however, be appreciated at once on inspection. On examination of an 18-ligne Omega watch submitted to us for test, we were struck by the cleanness of the construction and the attention paid to the details and finish.

There were no radical departures from accepted practice as regards general design, the main features of which can be seen on every Omega movement.

The keyless work is of usual type, but well proportioned and of very strong construction. The 'bolt and bolt screw' are really a first-class job that should withstand any amount of hard fore, that this organisation must have the wear. In operation it was found to be a very easy winding keyless work and the design provides a strong and efficient piece of mechanism.

The barrel is well made and finished, and has a hardened and tempered steel arbor which was exceptionally well polished. The mainspring is of high quality.

The train is of good design with well polished leaves and pivots.

The club-tooth escape wheel is clean cut and will cause very little friction.

The bi-metallic balance is accurately finished and carried on highly finished staff, on which is mounted, a double roller with a D-shaped roller pin. The balance spring is of steel with a correctly shaped overcoil.

The general construction of the watch throughout is excellent, and this, combined with the sound design, should ensure that reliable and long service can be confidently expected from it.

The performance tests carried out in the Horological Department of the Northampton Polytechnic Institute showed that the watch was well compensated for temperature changes and that the general timekeeping was of a high order. (Horological Journal—January 1935).

The Sole Agent for Omega Watches for India and Burma is Messrs. Ch. Abrecht of D5 Clive Buildings 8, Clive Street, Calcutta and Whiteaway Laidlaw Building, Hornby Road, Bombay.

ALL THAT GLITTERS IS NOT GOLD.

Similarly all Lamps and Lanterns are not Coleman. Always look for and insist on getting this name—the symbol for quality and believe in the slogan "best is the cheapest in the long run". These lamps and lanterns are the best on the market. They are absolutely safe and simple to operate, plus the advantages of decidedly lower operating cost and cheaper recurring expenses. They are ideal for mofussil districts where electricity is not available and good light is required. They are most aptly called the "Sunshine of the Night" all over the world, as the bright white light they give is sufficient to turn night into day. They burn ordinary kerosene oil and require only one pumping per night. Their special outstanding features are green enamel ventilator top that will not discolour from heat—built-in-pumps—heat and rain resisting Pyrex glass chimney—shut-off-valve—automatic tip cleaning device—extra large generator that requires no frequent replacement like other generators.

Other quality articles made by the Coleman Lamp & Stove Co. are the Instant-Lite Camp Stove which requires no preheating—no generating—but lights instantly with a match stick like city gas! Built-in-Pump and burns petrol at a trifling cost. It bakes, boils, toasts, roasts—cooks anything, any time and anywhere. Wildest gales will not affect the flame. Has double burner and regulates instantly. Safe and simple to operate—leaves nothing, not even ashes to start any fire. An ideal cooking range for every household.

Instant-Lite Iron which requires no installation—no tubes or cords. Just strike a match open the valve and instantly the Iron is ready for use anywhere—indoors or out. Burns petrol and instant regulation high or low according to requirements. Body finished in blue porcelain enamel to match the cool blue handle. Safe, simple and economical. The most attractive Iron ever placed on the market—it "Smooths the way on ironing day."

Flashlight Cases made of the finest materials obtainable and correctly engineered for long and faithful service.

Sunshine Batteries with the new fibre seal that cannot possibly short circuit. The new fibre top seal protects the power that is built into these long life Cells. They test exceptionally high in amperage, have long life Cells. They test exceptionally high in amperage, have long shelf-life, are constructed to withstand hard usage and will give equally satisfactory service on other flashlights.

The products described here are worth buying and the money spent is a judicious investment. The name Coleman guarantees that they are made by the reputed manufacturers of only first quality articles. Messrs. Blackwood, Blackwood & Co., 4, Lyons Range, Calcutta, the Sole Agents for Coleman products for India assure us that no order is too small or too large to receive their prompt and careful attention.

REVIEW OF BOOKS

LIFE AND SPEECHES OF SIR VITHALDAS THACKERSEY by Prof. Hiralal Lallubhai Kaji, M.A., B.Sc., I.E.S., J.P. Published by D. B. Taraporevala Sons & Co., Hornby Road, Fort, Bombay. Pages 565.

Sir Vithaldas Thackersey was a man of marked ability in financial, industrial, and commercial organisations with a high sense of public duty. He held most of the important public positions ordinarily open to a non-official Indian of his day. He was President of the Indian Merchants Chamber and Bureau, President of Mill-owners' Association, Chairman of Bombay Back Bay Scheme, and Member of the Bombay Port Trust and of various other public institutions and bodies. He also distinguished himself in Bombay Municipal Corporation, Indian Legislative Assembly, and Bombay Legislative Council.

The life and work of a man of such marked activity makes a most fascinating reading. It is likely to inspire our young men in improving their own industries and taking some share in shaping the destiny of the country. Prof. Kaji, the eminent professor of the Sydenham College of Commerce, is therefore to be congratulated upon bringing out a biography of Sir Thackersey. He shows how Sir Thackersey won one laurel after another by his thorough-going methods and traces his manifold activities from year to year. The book also provides his economic doctrines some of which met wide recognition and had been accepted by the economists of the day. The speeches he delivered on various economic subjects like cotton excise duty, exchange and finance, gold standard reserve, purchase of stores in the Legislatures and on other occasions have been included. This is obviously a right step which brings out the man in his true perspective.

The noblest trait that we mark in his character is his abiding faith in thoroughgoing methods and confidence in himself in the face of financial collapse. He was born in an affluent family possessing four cotton mills but from his very boyhood he evinced interest in receiving training from his father about mill management. At the comparatively young age of 20 he was called upon on the death of his father to take up the heavy responsibility of managing the family mills and he did not hesitate a single day to rise equal to the occasion. From the very beginning he made it a point to have a complete mastery over the techniques in cotton in-

dustry, and this stood him in great stead when he started more mills. He did not stop at that. He made a special study of the varied problems affecting the cotton industry and expressed his views on these subjects when opportunities occurred. This strengthened his position as an industrialist and his advice was sought after on those matters by the Government and other important bodies.

His activities were not confined within the precincts of the cotton mills. He had a wonderful foresight of the industrial movements to come. He was a prince of industrialists and was connected as a director with a large number of industries including cotton and woollen mills, railways, cement factories, banking institutions, electric power supply, etc., etc. As a sound financier he stood shoulders above his compeers. As a municipal councillor, when comparatively young, he carried out a resolution urging the Corporation to borrow in the open market, rather than from a bank at a high rate of interest. All the time he was in connection with the Legislature he stood out as a great personality representing forcibly to the attention of the Government the points of view of his countrymen in general and of the industrial and commercial community in particular. He strongly denounced the cotton excise duty, urged the location of gold standard in India, opposed the imposition of duty on silver and encouraged the manufacture of locomotives, rolling stocks in India. His speech on currency and exchange just before his premature death in 1922 shows his courageous grasp of economic matters.

Another feature in his character is that he believed that the businessmen should take living interest in the economic questions of the day. When he was a member of the Bombay Legislative Council he averred that a merchant was better qualified than most speakers to speak on economic questions and to advise Government in the shaping of industrial and commercial policies.

Sir Thackersey was convinced that the banking facilities were quite inadequate in the country. He therefore started the India Specie Bank, which unfortunately went into liquidation. He was instrumental in founding the Bombay Co-operative Bank.

The life of such a man no doubt will be found to be interesting and inspiring. We would ask our readers to go through this book which gives not only his achievements but also

shows the man in his family life, his amiable manners and kind temperament.

UNDERSTAND THE CHINESE by William Martin. Published by Methuen & Co. Ltd., 36, Essex Street, London W. C. Pages 250, price 7s. 6d.

China is still the terra incognita. Though lately much has been written about the country, there are very few books which paint the Chinese in their true colour. The country draws a large number of travellers each year, and possessed as many of them are with the idea of acquiring fame as an observer of men and matters they rush into print after a nominal stay of hardly 3 weeks in a vast country like China.

Here is a book on China which will at once arrest the attention of the readers as something new. It does not indulge in sweeping remarks about that country but makes a sympathetic attempt to show the Chinaman as he is. There is no sinister motive behind the book to black-mail the Chinese nor there is in evidence any propaganda to glorify the Chinese in their fight against the Japanese.

Mr. Martin, formerly foreign editor of the *Journal of Geneva*, made an extensive tour throughout the length and breadth of the country. He had been at Shanghai, Peking, Kuling, Yangtse Valley, Nankin, Hangchow and has presented a true picture of China, her difficulties and aspirations, manners and customs, history and philosophy, domestic and social life, and industrial and political changes. The tragedy of modern China, explains Mr. Martin, has been the transition from one civilization to another. This explains all the problems, moral, political, judicial, technical which are crowding in on the Chinese. China is modernising herself not like Japan through a harmonious process of evolution but amid the pains of a new birth.

In answer to the general question whether China is in chaotic condition, Mr. Martin tells us that China is not in chaos. There are troublesome superficial disturbances beyond any question, and they impose no undeserved suffering on the population; but they do not go deep. A country is not in chaos when it has a traditional organization that is still almost intact, and a social framework of such strength. In the towns this framework has more or less disappeared, and it is that fact that often gives foreigners an impression of disorder. But in the villages and the provinces this organization of the past still subsists. It cannot serve as the basis of an administration of modern and

Western character. The Government cannot build on the existing framework, and is obliged to organize the country from the top downwards, instead of proceeding, in the more normal way, from the bottom upwards. But the existence of this old village framework gives the national organisation unsuspected resisting power against a political virus.

CONQUEST OF UGLINESS. Edited by John De La Valette. Published by Methuen & Co. Ltd., 36, Essex Street, London W. C. 2. Pages 207, price 8s. 6d.

A stigma generally attaches to the machine-made articles in as much as they leave no room for the display of industrial art—they are of monotonous design. A movement is now on to see how far ugliness of mass production can be conquered by a well-chalked out policy.

Bearing a foreword by H. R. H. The Prince of Wales, the volume under review is a collection of contemporary views on the place of art in industry. The book draws pointed attention of the large scale manufacturers to the fact that the artistic side of industry can no longer be neglected. In fact, we are one with the Prince of Wales; that beauty is not the least telling factor among those which account for the appeal that an article makes in domestic and foreign trade.

The volume combines the views and constructive criticisms of a large number of prominent men competent to write on this complex subject. They approach the problem from widely different angles but always from a practical point of view. There are helpful guidance how art may be introduced in the get up of articles of daily need—in glasswares, trimkets, textiles, metalwares, printing, etc. etc.

HAND BOOK OF TEA MANUFACTURE. By Abinash Chandra Dutt. Published by the author from Sreebari Tea Estate, Rasidpur, Sylhet. Price Rs. 3-8, pages 93.

The book under review collates all the important method of tea manufacture from various journals and books dealing with the same subject. The processes described are not only systematic and practical but are also in condensed form and written in very simple language avoiding technicalities as far as practicable. Both old and modern methods have been treated fully so that the newcomer to tea industry may conduct his business without any difficulty on going through the book. The author who has been connected with a tea estate for a long time has spared no pains in making the book useful by solving the difficulties met in conducting tea industry.

NOTICES & REVIEWS.

[Manufacturers sending specimens and samples of their products for notice and review may please note that no notice is published of medicinal preparations and allied substances in this section.]

Safety Razor Blade.

We have received from Indo-Western Corporation Ltd, 28, Waterloo Street, Calcutta a sample of "Swastika" safety razor blade, which is found to be good.

Boot Polish.

We are glad to receive a tin of "Nyaga" boot polish manufactured by Messrs. Ambelal Brothers, Post Box, 177, Mombasa, Kenya Colony. The preparation is quite satisfactory and is in no way inferior to the best brands of similar articles found in the market.

An Insurance Journal.

This new monthly Industrial Insurance in Bengali will be of much help to Bengali-knowing people. Its aim is to spread the benefit of insurance among the masses. The issue under review contains many interesting and instructive articles from the pen of those who are actually engaged in this line. The office of the journal is situated at 25, Tarak Chatterjee Lane, Calcutta.

A New Scientific Journal

The inaugural number of quarterly journal "Research & Progress" published under the able editorship of Dr. Karl Kerkhof contains many interesting articles bearing on science and research. We feel sure that students of science would be glad to hear about this scientific journal which will supply the latest scientific developments in Germany. The Office of the Journal is situated at Unter den Linden 38, Berlin NW7, Germany. Its annual subscription is 6s. only.

Commercial Information Society.

We are given to understand that a Society under the name of Indisch-Zentrale-Europäische Gesellschaft, (Indian Central European Society), 1, Tuchlauben 7a/19, Vienna, Austria, Europe had been inaugurated in 1934, under the patronage of many prominent members of the commercial and cultural community of India and Central-Europe. The purpose of the Society is to develop direct trade relations and culture interchange between India and Central-Europe. Such direct commercial contact will, certainly yield advantages for both sides.

Guts.

We have the pleasure to receive from Messrs. Coxwell & Co. Sialkot City, Punjab samples of guts of superior qualities. We wish them a wide market.

Boot Polish and Cream.

We have received from The Modern Industries Ferozepore, 77, Bungalow, Ferozepore Cantt., Punjab samples of "Peacock" brand boot polish, and creams of dark tan colour, light brown colour, etc. We have tested the preparations and found them to be of superior quality.

Scented Hair Oils

We have received from Kaula's Scientific and Toilet Goods Mfg. Co, 124/B, Dharamtala Street, Calcutta a sample phial of scented oil. The preparation is delightfully perfumed to suit the modern taste.

We have also received from S R. Rau, T 48, Rly. Lines, Egmore, S.I., a sample phial of scented hair oil.

Buttons.

We are extremely pleased with the samples of pearl and horn buttons made by Home-Made Button Mfg. Co., Farashganj Road, Dacca, Bengal. These buttons are artistically finished and can be compared favourably with the best brands of similar articles imported from abroad. We hope that our countrymen would do well to extend their patronage to this Indian manufacturer.

An Indian Industrialist Abroad.

We have much pleasure to introduce to our readers India Incense Company of 116, West Illinois Street, Chicago, Illinois, U.S.A. This is an Indian enterprise in the far off America being the outcome of labour and business acumen of our countryman Dr. Satish Chandra Ghose. The Company, as will appear from the name of the firm, manufactures Indian incense suiting to the taste of the Americans and has created a good market for its products there. Dr. Ghose came to India on a brief sojourn to study what other Indian articles could be presented to the U.S.A. markets. He invites correspondence from persons who desire to push Indian articles of arts, crafts, etc. in America.

Trade Enquiries.

(To communicate with any party write to him direct with name and address given below mentioning Industry).

608 M. Cohen, 33, Elliot Road, Calcutta—Wants to be put in touch with the suppliers of jute spinning charkas

931 Thakur Kishor Singh, Depakhera, Sitapur State—Can supply grass in large quantity.

1017 D. Ghisulali, 181, Amankoil Street, G. T. Madras—Wants to be put in touch with dealers in salted vegetables and meat.

1127 Ambalal Mohanlal & Co., Chitori Bazar, Cambay—Want a capitalist partner with Rs 2 lakhs for working a lead mine in India.

1129 Rajambhai Meherally & Sons, Jassani Bldgs, Hains Road, Bombay—Want to be put in touch with the manufacturers of cork mats and mattings in India.

1131 K. V. Kumariah Chettyar, 105, Ramaswamy Street, Mannady, Madras—Wants to be put in touch with the manufacturers of brass vessels at Calcutta, Moradabad, Delhi, Poona, Bombay, Benares and Bangalore

1198 A. Khanday Rao & Sons, Sadar Bazar, Nagpur—Can supply limestone and dolomite stone in large quantity.

1209 S. Hanumantha Rau, B.Sc., C/o, Mr. S. Lakshmi Kantha Rau, B.A., B.Ed., Science Assistant, B. H. School, Kavali, Nellore—Wants to be put in touch with the manufacturers of China clay and various kinds of gum.

1237 Girindra Nath Banerjee, 56, Mandie Street, Uttarpara, Hooghly—Wants a capitalist to work a scheme of manufacturing cement at very low cost from river silt, he may also sell the formula (already patented) at remunerative price.

1239 P. Nageswara Rai, Charkha Sangham, Gudivada, Kistna—Can supply six sided crystals and karpur silajith in large quantity

1250 K. S. Rao, Textile Expert, Department of Industries, Bihar & Orissa, Patna—Wants to be put in touch with a person who can teach bee-keeping.

1260 R. C. Sarma, P. O. Dalgaoon, Vill Burrigaon, Darrang—Can supply akand and bindi fibres.

1262 The Universal Pharmacy, Itwari, Nagpur City—Wants to be put in touch with the suppliers of 'Chiretta' seeds.

1296 Ram Narain & Bros., Alwar, Rajputana—Wants to be put in touch with dealers in C. P. Teak at Itarsi and other places.

1329 Chandi Prasad C/o. The Meerut Commercial Syndicate, Meerut—Wants to be put in touch with the suppliers of sola or pith.

1336 Ali Brothers, Nagdevi Street, Bombay—Wants to be put in touch with the suppliers of "costus root."

1338 M. Rahmeth, 10, Municipal Market, Nellore—Can supply ghee and chironji.

AUGUST ISSUE OF INDUSTRY.

(In the Press).

August issue of Industry which will be published on the first day of the month will contain articles on Film Industry, The Drying of Finished Cigarettes, Manufacture of Saltpetre, etc., besides the usual features such as Small Trades and Recipes; Formulas, Processes and Answers; Reader's Business Problems; Brief Queries, and Replies. Any friend of our subscribers will get a copy free as sample on application to the Manager, Industry, Shambazar, Calcutta.

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Industry

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NO. 305.

THE MISSION OF KHADI.

THAT khadi has a mission to fulfil has been told unnumbered times. It is to provide a supplementary industry to agriculture, says Gandhiji recently in an article in his *Harijan*.

The villagers cook their *roti* and rice—they do it because no machine-made cheap food is available in the market. The farmer is forgetting to make his own rice from the paddy he grows and his own *atta* from his own wheat as rice and *atta* are now become available ready made from mills set up in towns and even agricultural villages.

The farmer can grow his cotton if there is buyer to purchase it. If he spins his own yarn it fetches him so small an income that he will not undertake it. This may save him something in the price of cloth. But inducement to earn is much stronger than the idea to save. Give him a new idea of earning and he will move.

There is some market for loom-made cloth. The weaver purchases his own cloth and sells his manufacture. If he is told to weave cloth for his own wear all the handlooms in the country will be shut.

The greatest drudgery in an Indian home is the cooking because it does not make any money. As such it is left to the women who do not count in the earning occupations.

As Gandhiji stated, "simplest spinning requires the cunning of the hand." Yet it fetches in money not more than one sixth of what simple weaving fetches which to quote Gandhiji again "is a mechanical process." This is because weaving has a market value whereas spinning has no market value.

Provide spinner with an implement that will enable him to make certain income. He will immediately adopt it. If labour aims at the production of money the doctrine of equality of wages is sound; but the labour must be made to earn and not to save. Wages in rural India are fixed by prices of agricultural products and as long as the weaver can earn by plying

his loom more than what is earned by plying the plough no Association can induce them to a lower scale of wages—equalisation or stabilization of wages is dependent on agricultural income which is and will remain the standard on which stands all stabilization.

Profiteering bodies in industry pay to the labourers more than what the farmer earns from his field, that is why the labour flocks to drive their wheel. And more profit they earn and accumulate, more men rush to them for work—idea with the labour is not what he can lay by or save but what he earns that prompts him to work; he wastes his earning on drink not because he earns but because of his environment.

The mission of the khadi should be to create new ideas of spinning and weaving which will fetch more money. Workers we have in plenty, we do not require big machineries to reduce manual labour. We want such implements as would enable millions of our men to produce under home organisation goods which million-worth mills manufacture in big factories in countries where manpower is in discount.

We have developed a transport service in the teeth of hundred difficulties—the motor transport service—in competition with the big capitalist-Railway transport service. We have done it on a line suitable to our necessities and compatible with our inclination. May be in this transport line our earning per measure of goods or per trip of runs is below what the Railways earn. Yet what we earn is more than what our fields provide. It is an extending trade and there is much room for development. In all industries we can develop only on the line compatible with our needs and our mentality; that is, providing our labourers with implements that will help them to produce at a profit higher than the agricultural income.

Whether it is cut-throat competition or capitalistic profiteering you can induce the labourer to work only on earning basis. Otherwise if you found thousands of associations to serve the pauper millions, you cannot remove poverty and help the people earn. The mission of khadi should be an active earning mission and not a passive saving mission.

If money-making were easy, there would be plenty of well-to-do people. But it is not easy.

It requires knowledge and skill and energy and ambition. A man must think more of his week than he does of his week-end, if he wants to climb up to be a money-maker.

Making money is hard. It calls for all that is best in a man. It compels him to develop in usefulness and character.

The curse of the world is Poverty. And the only really useful social reformers are those who are helping to abolish it.

—EFFICIENCY MAGAZINE.

THE FILM INDUSTRY.

THE film industry to-day is one of the foremost national industries in all advanced countries, and it is classed not only as the best entertainment or luxury but as one of the most potent instrument of propaganda and education in its very broadest sense. It exercises a prodigious influence over the thoughts, habits, and outlook of men's life, and so goes a great way to mould the very character of a nation. The film has already become a live force in the world and the future would realise its importance far more seriously than people of to-day seem to do.

The industry in India has assumed considerable dimensions only within the last few years; and yet at this stage the number and footage of feature films produced in this country is largely in excess of the number and footage of feature films produced in the United Kingdom. This phenomenal increase of production in India, is indeed remarkable, if it be remembered that the period was one of trade depression, when the raising of capital for any industrial enterprise was extremely difficult.

FACTORS FAVOURABLE TO THE INDUSTRY.

The film has come to stay in India and its potentiality can be understood if we try to take into account some of the factors that are favourable to its development. Climatically India is suited for film production. Again "India is well-supplied within her borders with every variety of natural scenery, including scenery of grandeur and beauty scarcely

to be surpassed in the world. She possesses an abundance of ancient palaces, fortresses and temples and provides ready made the most picturesque Oriental settings—streets, markets, crowds and so on—which can only be reproduced artificially in the West at enormous cost. Also almost every Oriental type of humanity is to be found." The cost of production is extremely low in India. The cost of producing a picture in India is less than the cost of producing a picture in England and further "less than in America. Moreover, to appeal to the mass of the population no elaborate production is here required. The Indian films command a better hire and yield better returns to the exhibitor than the ordinary run of imported film. Although the exhibitor has to pay more for the Indian film his gross receipts are greater owing to much larger attendance. "The crowds which flock to witness a popular Indian film are really remarkable." All these lead to the conclusion that the field for an indigenous film industry is well laid out and that a timely encouragement given to this infant industry, on sound and healthy lines, would, in course of time, develop it into sturdy manhood and add another profitable industry to India's account.

TWO TYPES OF FILMS.

There are two distinct types of cinematograph film, known as positive and negative. The latter is first used to record the pictures with the aid of a special camera, and the former is the completed article which is passed through the projector in the cinema halls. Both

are transparent and have a celluloid base. The raw material of the industry is therefore the emulsioned and highly-sensitive negative film in its unexposed condition, and the finished product is the developed positive film with the series of pictures on its surface. Between the receipt of the one and the release to the trade of the other lie all the complicated processes of film production.

The base or transparent foundation of both positive and negative film is celluloid, a highly inflammable substance made from camphor and tetra-nitro-cellulose, specially toughened to enable it to stand being passed through many projectors during its travels round the electric theatres.

Before being coated with sensitive photographic emulsion both the positive and negative bases are known as raw-film stock, which consists of long rolls of order to make the negative, a roll of this is coated on one side with silver-bromide emulsion, and to make the positive a roll of the specially toughened celluloid is coated on one side with a much less sensitive, or slower photographic emulsion. The negative is orthochromatic, or sensitive to green, yellow, blue and violet light, but the positive is not orthochromatic, and can therefore be handled in yellow or orange light.

After coating with the more or the less sensitive emulsion, as the case may be, the long rolls of celluloid are cut into strips ribbon 1.3/8 ins. wide and 400 ft. long. The average thickness is about six-thousandths of an inch. The long strips are then perforated, rolled on bobbins, enclosed in light-tight cases and sent to the film-producing studios or

factories. The negative to be used in the cinematograph camera for taking the pictures and the positive for obtaining "prints" from the negative and for use in the projectors of the exhibiting theatres.

It is at this point that the film industry really takes up the work. The making of the emulsion-coated celluloid is entirely within the province of the manufacturer of photographic materials such as Kodak Coy. of U. S. A., hence the process of its manufacture has been dispensed with.

The rolls of both negative and positive film vary in length from 200 ft. to 400 ft., but they can be easily cut with a pair of scissors or joined with film cement. In this way any required length can be made up.

Before being used both kinds of film must be passed through a machine which cuts small oblong holes, at regular distances from each other, along both edges of the celluloid. These perforation enable the teeth of sprocket wheels to engage and move the film along, which is the universal way of passing negative and positive through camera, printer and projector.

The positive film, which is used as base for the finished product of the industry, can now be left for future reference. It has much in common with the print taken from an ordinary photographic negative, and is not employed until the original has actually been made.

The first of the two kinds of film to be considered is, therefore, the negative, which is supplied to the industry in rolls ready to be taken to the dark-room and there unpacked from its light-proof

wrapping and placed carefully in the film-boxes ready for the cameras.

Before describing the actual process of taking of motion pictures, we must devote ourselves in dealing with cinematograph camera essential in this industry.

THE CAMERA.

There is nothing very complicated in the general design or mechanical details of the up-to-date cinematograph camera. It is little more than an ordinary roll-film camera arranged so that, by the turning of a handle on the outside of the case, a number of pictures amounting to about 16 a second, may be taken in succession instead of from one to six, as in the ordinary snap-shot apparatus. It consists of a mahogany box measuring 14 ins. in length, by $5\frac{1}{2}$ ins. in width, and 15 ins. in height, with brass protecting corners and leather carrying strap. The supply and take-up boxes, which are enclosed in the mahogany case, each hold 330 ft. of film. There is a focussing tube from the exposure window to an aperture in the back of the case; and by means of a four-picture continuous movement sprocket, for both feed and take-up, with free loop on either side of pressure gate, a steady passing of the film is assured.

The general arrangement of the mechanism in the mahogany case, and the path taken by the film can be better understood by handling a camera. The loaded film-box is placed on the top of the receiving box. The film after leaving the top box is passed under a fixed roller and after engaging with the teeth of the sprocket is passed under the spring roller lifted by a finger clip and from a

free loop. It is then passed through the spring gate and another free loop. After this the film is made its way under the sprocket and held in position by a spring roller and a fixed roller until it is finally passed through the velvet lined slot into the receiving box, the end being fixed to a centre bobbin.

TAKING CINEMATOGRAPH PICTURES.

In taking cinematograph pictures, the first thing is to load the empty film box with the film. For this purpose it is taken to the dark-room, together with a tin of unexposed film. The tin of film is then unfastened, the wrappings removed, and the roll lifted out. Care must be taken not to let it unwind; except for about 3 inches at the outer end. The roll is placed over a wooden hub on the spindle in the middle of the box. The loose end of the film is next passed under the roller situated in the corner of the box and through the slit. The door of the film-box is then shut and fastened.

This loaded box is then inserted in the upper part of the camera, first pulling out the protruding film for a length of about 18 inches. The box should be placed so that the slit is at the lower left-hand corner. The film is then passed carefully through the camera mechanism just behind the lens and finally passed through the slit at the left-hand bottom corner roller, and to the empty hub on the spindle, this time securing the end of the film under the spring clip on the hub.

The camera handle is now slowly turned till the film has wound once or twice on the hub, in order to see that all is working properly, after which the door of the take-up film box is closed and

fastened and the camera door also secured. All is then ready for operating.

USING THE CAMERA.

The manner of starting work depends a good deal on the subject. If a scenic one, it is possible to choose the time when the view or landscape will be pleasingly lit. As a general rule, this will be when the sun is on one side of the camera and a little behind it. When there is a wide choice of position, the most effective lighting can probably be obtained merely by careful selection of standpoint on this place, the stand must be erected firmly. The camera is then screwed on top and the lens is directed towards the subject, opening it to the largest stop by turning the ring or projection on the iris diaphragm. The cap is removed from the finder tube, and, looking through this from the back the picture is focussed as sharply as possible on the film in the gate by slowly moving the milled bead of the onion, or rotating the focussing ring if that is fitted instead.

Next the lens stop is adjusted. The purpose of the stop or diaphragm is to secure greater equality of focus between distant and near objects occurring in the same picture and at the same time to enable the exposure to be varied by regulating the amount of light that passes to the film. Having adjusted the lens stop, the speed of Camera shutter is also regulated to pass the amount of light necessary, to make the exposure and the rapidity with which moving objects pass before the lens.

Now in taking films for staged subjects and story pictures, a well-lighted studio with ample room is indispensable. There should be liberal glazing for the

admission of day light, while, unless the work is to be hindered by time and weather, an adequate installation of mercury-vapour or lamps is also required. The scenery and accessories are much the same as for the ordinary theatre, save that backgrounds, etc., which may be in mono-chrome instead of colour.

ACTUAL OPERATION.

When everything is ready for exposure, the operator starts turning the handle. This must be done steadily and evenly, at the rate of two turns per second. If the whole spool, there is nothing to do but continue turning until the handle suddenly runs easier, thus showing that all the film is through; whereas if only a portion of the spool is wanted, the outside measurer must be watched and the turning stopped directly the desired figure is recorded. It is usual to indicate the end of the exposure in such a case, either by operating a punching device or by opening the camera and nicking a small piece out of the edge of the film with a scissors.

DEVELOPING FILMS.

The exposed film is next developed. For this purpose it is first wound on a frame—of course, in a "safe" light. The kind of frame now mostly used is known as the flat frame. It is generally made of teak, with a row of projecting brass pegs at top and bottom to prevent the film overlapping.

To wind, the end of the film is secured to the top bar by a drawing pin, and the frame is then revolved slowly away from the operator, at the same time guiding the film into position between the pegs as it unrolls and winds over the bars. It should be wound rather tightly, though

without actual strain, as it expands when wet.

The film having been wound on the frame is passed on to the subsequent process of development. This is generally done in flat stone ware troughs having grooves or divisions. A close-fitting lid or cover is advisable, to prevent oxidation of the developer. For the amateur a flat trough or dish is most convenient.

The quantity of developer required depends on the size of the dish or tank, and must be sufficient to cover the film completely and for at least $\frac{1}{2}$ in. above the top edge. The formula is largely a matter of personal preference, and practically any non-staining developer which will produce a good ordinary negative will act satisfactorily with films. It is the best policy to use the formula recommended by the maker of the particular film selected, as this is sure to have been tested and found to give good results.

A typical formula is:—

Sodium sulphite	5 lbs.
Sodium carbonate	2½ "
Potassium metabisulphite	1½ oz.
Metol	160 gr.
Hydroquinone	5 oz.
Potassium Bromide	4 "
Citric acid	4 "
Distilled water to produce	60 pints.

This solution should be used at a temperature of from 65° to 70°F; it will keep about a fortnight, and may be worked repeatedly till signs of exhaustion begin to be evident.

Another good developer is as follows:—

Soda sulphite	24 oz.
Sodium carbonate	12 "
Potassium Metabisulphite	1½ "

Metol	2 oz.
Hydroquinone	2 "
Water to produce	60 pints.

DEVELOPMENT.

In developing a film the time of immersion should first be noted by developing a short trial strip cut from the film to be dealt with, taking care that the solution is not allowed to act long enough to clog up the high lights of the pictures, which, of course, are the darker portion of the negative. It is as well to rinse and fix the trial strip also, in order to see whether proper allowance has been made for the accompanying reduction in density.

A suitable formula for the fixing bath is:—

Sodium Hyposulphite	14 lbs.
Potassium Metabisulphite	1½ "
Water to produce	56 pints.

Having developed the trial strip satisfactorily and noted the exact time, the wound length of film is placed in the dish or tank, moving the frame gently once or twice to dislodge air-bubbles and ensure even action. It is then left for about a minute and again slightly agitated, after which it is allowed to remain undisturbed till the expiration of the ascertained time, when it is rinsed promptly in plain water and immersed in the fixing bath. There it should stay for a few minutes longer than is necessary to remove all creaminess and render the pictures transparent. The film is then washed in running water for about one hour.

DRYING THE FILM.

The film negative has now to be dried. This may be done merely by mounting the flat frame holding the film

on the stand used when winding, and revolving it quickly by hand or motor in a well ventilated place free from dust. Many, however, prefer to transfer the film to a drying drum.

The drying drum consists of two thick wooden discs between which are nailed a number of thin springy laths placed a short distance apart. The drum has an axle through its centre, and is supported on a stand so that it may be revolved. The springiness of the laths is intended to compensate for the contraction of the film in drying.

To wind, the end of the film is secured on the drum with drawing-pins or a dip and the drum is slowly revolved as the film is unwound from the developing frame, until all is transferred. The other end is then secured, and the film is left to dry spontaneously in a warm room, with an occasional turn of the drum to prevent drops collecting.

CLEANING THE DRIED FILM.

When dry, the celluloid side of the film is cleaned from finger-marks with a soft rag slightly moistened with methylated spirit. The usual method of working is to have a small hole cut in the bench and covered with glass let in flush, the light from an electric bulb, or reflected daylight if preferred, being thrown upward through the opening. The bench should be covered with clean paper during the operation.

REMEDYING UNDER-EXPOSURE.

When the film is under-exposed, its remedy is intensification; for under-exposure and over-development there is rarely an effective cure, though reduction in ammonium persulphate, which attacks the lights more than the shadows, may

occasionally be worth while. This reducer may consist of 200 gr. of ammonium persulphate to each pint of water, made fresh as required. The film after the usual final washing is immersed in this till a little less reduced than is wanted and is at once placed in a 5 per cent. solution of sodium sulphite, in which it is left for a few minutes, and then well washed.

REMEDYING OVER-EXPOSURE.

When the film is over-exposed, it will either be of excessive density, lacking in contrast and flat, or, if also under-developed, it will be thin and flat. For an over-dense flat film the remedy is treatment with ferricyanide and "hypo" reducer; while for the thin and flat type of over-exposure the best thing is first to reduce with ferricyanide and "hypo," which acts a little more on the shadows than on the lights, and then to intensify, so that sufficient density and contrast are obtained. The formula for reducer is:— 2 oz. of "hypo" to the pint of water, to which is added, directly before use, from 1 oz. to 2 oz. per pint of a 10 per cent. solution of potassium ferricyanide. The "hypo" is first dissolved in about a third of the water warmed, the remaining water being then added and the ferricyanide solution stirred in. The bath should be used at once, as it does not keep well.

PRINTING THE POSITIVE FILM.

To make a positive film from the negative a machine called a printer is employed. Printers are of two kinds, the older continuous type, in which the two films are run together in contact past an exposure opening without stoppage, and the more modern "step by step" pattern, in which the films are stopped intermit-

tently by a claw movement resembling that in the camera during exposure. The step-by-step printer gives the more accurate registration and is that generally adopted by professional workers. They are, however, elaborate and expensive. The continuous pattern is cheaper, and is well suited for work on a small scale.

In continuous printer, the negative film is contained on one spool and the unexposed positive film on another, the two being passed, emulsion sides together through a pressure gate in front of the exposure opening. There is a sprocket-wheel under which the films are threaded, a spring roller, preventing slipping. The machine is also supplied with a driving handle and a pulley wheel for connecting to a motor if desired. The electric lamp supplies the necessary light, and may be shifted nearer to, or farther away from, the opening, to suit negatives of different density, by a lever. There is a panel mounted on the partition in front light-box so that no light reaches the film except through the exposure aperture. The films, as run through, are received by two additional spools on which the negative and positive films are wound off.

DEVELOPING POSITIVE FILM.

Having finished the printing, the positive film is collected on a spool, in order to handle it conveniently, and is then wound on a frame for developing, which is done in just the same way as with negatives. The same developer may be used if care is taken not to clog up the high lights, but most workers prefer a solution kept specially for the purpose. A good formula is:—

VOL. XXVI. No. 305.

Sodium sulphite	3½ lbs.
Sodium carbonate	3 lbs.
Potassium metabisulphite	1 oz.
Hydroquinone	8½ oz.
Potassium bromide	1 oz.
Water to produce	60 pints.

TONING POSITIVE FILM.

To suit a particular effect, it may be required to have the positive of a special tone. This may be attained by treating it in a chemical toning bath. Practically any of the formulas used by the photographer for toning bromide prints is suitable, but a few approved ones are here given. Strict cleanliness is necessary in the tanks or dishes employed.

SEPIA TONING.

FIRST BATH A.

Ammonium Bromide	1 lb.
Potassium Ferricyanide	3 lbs.
Water	60 pints.

Immerse film till the silver image has bleached to a milky white. Wash for a minute and transfer to:—

SECOND BATH B.

Sodium sulphide pure	2 lbs.
Water	60 pints.
Keep for a few seconds and wash.	

PURPLE BLACK.

Copper sulphate	4 oz.
Potassium citrate	3 lbs.
Potassium Ferricyanide	3½ oz.
Water	60 pints.

Immersion of from 10 to 20 seconds in this bath does wonders for a film. Wash.

BLUE.

Ferric ammonium citrate	¼ oz.
Potassium Ferricyanide	¼ oz.
Acetic acid	4 oz.
Water	1 pint.

After toning in this bath, the film should be washed till this effect disappears.

TINGING POSITIVE FILMS.

Another method of varying the colour of a positive film, less troublesome than toning, but not quite so effective, is known as tinting, and consists of immersing the film in a weak aniline dye solution. The effect is to stain the whole film, both lights and shadows, though the real underlying colour of the image is not actually altered. Tinting does not suit all subjects, but with the majority very good effects may be secured. For titles and announcements it is often indispensable.

When all these stages have been worked up the film is ready for projection.

MANUFACTURE OF SALTPETRE.

SALTPETRE is to some extent a native as well as a chemical product. The well-known flocculent substance often observable on walls, especially those of stables, is composed in a great measure of nitrates; a similar phenomenon is seen in subterranean excavations, and even in many localities the surface of the soil is covered with an efflorescent saline deposit, consisting largely of potassium nitrate. These deposits are most common in Bihar, United Provinces, Punjab, Ceylon, and in some parts of South America, Spain, Hungary, and Egypt.

Although native saltpetre is met with under a variety of conditions, they all agree in this particular, that the salt is formed under the influence of organic matter. As already stated, the salt covers the soil, forming an efflorescence, which increases in abundance, and which if re-

moved has its place supplied in a short time. In this manner saltpetre, or nitre as it is sometimes called is obtained from the slimy mud deposited by the inundations of the Ganges. The main condition of the formation of saltpetre, which succeeds equally in open fields exposed to strong sunlight, under the shade of trees in forests or in caverns, is the presence of organic matter inducing the nitre formation by its slow combustion; the collateral conditions are dry air, little or no rain, and the presence in the soil of a weathered crystalline rock containing felspar, the potash of which favours the formation of the nitre of that base.

Although it occurs as a soil constituent in most countries, its economic separation in India depends upon the coincidental occurrence of certain factors favouring its formation in sufficiently high concentration to bring its production as a marketable commodity within the limited scope of a cottage industry. As the method of extraction involves solution in water and the use of fuel to concentrate the aqueous extract to the crystallising point, the lixiviation of the nitrate earth must be done with as little of water as possible.

EXTRACTION,

The earths from which the crude saltpetre is obtained, contain very varying amounts of nitrate. The usual process of extraction is carried out in a circular filter some 4'-6" in diameter and 1'-6" deep consisting of mud wall and floor-plastered with clay and having a platform of bamboos and straw about 4 inches above the ground, upon which the earth to be extracted is placed and carefully compacted by treading, to such a

consistency as to allow of even percolation of water, which is poured upon it and filters through, carrying off in solution the saltpetre and other soluble matters contained in the soil. The percolating water is collected in an earthen vessel but only the first lot collected is actually boiled down, as it removes the large percentage of the total nitrate present in the earth that the subsequently collected liquor is too weak a solution to pay for extraction, but is used again as a solvent in a fresh batch of nitre mud.

The strong liquor obtained by the first washing is boiled down in either an iron pan or an earthen one, or it is allowed to concentrate in a shallow masonry tray in the sun.

As these liquor concentrate, it first deposits common salt, especially when the operation is conducted over a fire. In this case when sufficiently concentrated, the whole is allowed to cool and the saltpetre crystallises out. The mixture of common salt and saltpetre separated from the liquor is thrown on the factory earth and allowed to dry up.

PURIFICATION.

Before submitting the liquor to the process of concentration, it is thoroughly mixed with wood ashes, which generally contains carbonate of potassium. The advantage of adding the wood ash is to convert the whole of calcium and magnesium nitrates present in the crude product into insoluble carbonates. The solid residue is then separated either by filtration or by decantation and the liquor thus obtained is next evaporated. The impure product obtained from the clarified liquor by slow evaporation in earthenware pots

is the saltpetre of commerce containing 45 to 70 per cent. of potassium nitrate.

REFINING.

The crude saltpetre is yellow-coloured, and contains on an average some 20 per cent. of impurities, consisting of deliquescent chlorides, earthy salts, and water. The object to be attained by the refining is the removal of these substances.

The method of refining saltpetre is based upon the fact that potassium nitrate is far more soluble in hot water than are the sodium and potassium chlorides. 600 litres of water are poured into a large cauldron, and 24 cwts. of the crude saltpetre are added at a gradually increasing temperature; as soon as the solution boils, 36 cwts. more crude saltpetre are added. Supposing the crude nitre to contain 20 per cent. of alkaline chlorides, the whole of the nitre will be dissolved in this quantity of water, while a portion of the chlorides will remain undissolved even at the boiling-point. The non-dissolved salt is removed by a perforated ladle, and the scum rising to the surface of the boiling liquid by the aid of a flat strainer. The organic matter present in the solution is removed by the aid of a solution of glue from 20 to 50 grammes of glue dissolved in 2 litres of water are taken for each hundred weight of saltpetre. In order that the saltpetre may crystallise, the quantity of water is increased to 1,000 litres, and as soon as this quantity of water is added the organic matter entangled in the glue rises as a scum to the surface and is removed. The operation having progressed so far, and the liquid being rendered quite clear, it is kept at a

temperature of 88° for about 12 hours, and then carefully ladled into copper crystallising vessels, constructed with the bottom a little higher at one end than at the other. The solution would yield on cooling large crystals of saltpetre, but this is purposely prevented by keeping the liquid in motion by means of stirrers, so as to produce the so-called flour of saltpetre, which is really the salt in a finely divided state. This is next transferred to wooden boxes, termed wash-vessels provided with a double bottom, the inner one being perforated, between the two bottoms holes are bored through the sides of the vessel, and when not required plugged with wooden pegs. Over the flour of saltpetre contained in these wooden troughs, 60 lbs. of a very concentrated solution of pure potassium nitrate are poured, and allowed to remain for two to three hours, the plugs being left in the holes. The plugs are then removed, the liquor run off, the holes again plugged, and the operation twice repeated, first with a fresh 60 lbs. and next with 24 lbs. of the solution of potassium nitrate, followed in each case by an equal quantity of water. The liquors which are run off in these operations are of course collected, the first being added to the crude saltpetre solution, while the latter, being solutions of nearly pure nitre, are again employed. The saltpetre is next dried at a gentle heat in a shallow vessel, sifted, and packed in casks.

Mr. Hassanali Amershi, P.O. Box 57, Mombasa, Kenya Colony writes on 8th May, 1935.

"I must congratulate you on the completion of an invaluable record of service for a quarter century by publishing *Industry*."

FOOD FOR POULTRY.

GREAT intelligence is necessary to determine the most suitable food for poultry. They must not only be palatable, easily digestible and nourishing but also must contain all the elements of a well-proportioned diet. Above all it must be economical, that is, must render the greatest benefit at the least cost but the quality should never be sacrificed to price.

The constituents of a nourishing food are water, protein, carbo-hydrates, fats and ash. All available food stuff containing these nutrients fall under (1) grains, (2) meals or prepared food, (3) green foods, (4) mineral foods.

The food may be given either whole or coarsely ground together with the bran. Barley is given mixed with wheat or whey. Next come oats, beans, peas, gram, which must be bruised and steeped in water before they are given. Maize or Indian corn may be given for fattening fowls; but it must not be given exclusively or very often to poultry kept for breeding or to growing birds.

Wheat constitutes by itself a well-balanced ration. It is more a growing feed than fattening feed. Hulled oats or oat meal is an excellent food for growing chicks. Barley ranks between oats and corn as a growing and fattening feed. Rice is not considered as a valuable diet. Rye, peas, sorghum seeds may also be administered.

The wheat and maize grown in India have a large albuminoid ratio. Most of the cheaper Indian grains such as paddy, juar (*Sorghum vulgare*) and bajra (*Pennisetum typhoideum*) contain a very large proportion of carbo-hydrates; also, their hard outer shells render them

somewhat indigestible or less readily assimilable than wheat or maize. Gram is a very valuable food with a high protein content, but it is not liked by fowls in the raw state, and should only be given in the form of a meal and mixed with other meals. Like all other pulses if fed to excess it causes the generation of gases in the intestines. Gram, when incorporated in the mash, should not amount to more than one-eighths part of the total weight.

An exclusively grain diet is however improperly balanced. Sometimes oil cakes are therefore mixed with the grain such as cotton seed or linseed meals. Even minced meat, chopped vegetables, fish-scrap have been given to poultry with profit. Skimmed milk or butter milk will also be found remarkable for poultry feed if they are obtained cheap. Indeed fowls use some animal food and green food for their nourishment and growth.

Mineral matter, which is always available in a hard form and not so easily assimilable, should be supplied to poultry in two forms. The first form is selected from mashed meal while the other is supplied from grit and oyster shells. Mineral matter is required for the up building of bone, and in the formation of egg shells.

FEEDING WITH DIFFERENT PURPOSES.

The food used by professional poultry farmers is given for some definite object. For example, (a) the production of eggs for table use; (b) the production of eggs for hatching purposes; (c) to obtain great size and prolific feathering in certain breeds for exhibition purposes; (d) to obtain hard and close feathering,

large bones, and fighting fitness, as in the game varieties; (e) to keep down size in the breeding of bantams.

In all the various branches of poultry farming the feeding is different, and breeders have discovered the best known methods of feeding for each different purpose by experience and experiment.

It has not yet dawned on the people of India that there are great possibilities in poultry farming if carried out properly. They have had no opportunity of learning to keep poultry on scientific lines.

GIVE ASSIMILABLE FOOD.

The modern highly productive hen, in order to keep up its high rate of production, must be fed with food of a highly nutritious and quickly assimilable nature, and if it cannot assimilate its food quickly enough to supply eggs at the rate which its fecundity demands its reserve body supply will be called upon and the bird will consequently "lay itself out," lose weight rapidly and go into a moult, and be so poor in condition that it will be the first to succumb to any disease which may be in the vicinity. Possibly the reason why we never get such high egg records in India is that the rations supplied are not so nutritious as those fed in countries where high records are obtained, and also because we have not yet learnt how to use to their full advantage those foodstuffs which become available to us.

BALANCED RATION.

The balanced ration, as we understand it, is a mixture of foodstuffs in which the proteins and carbohydrates are present in the proportion of one to five. But it is not safe to rely on a ration balanced in this way without taking into

consideration such important items as bulk, proportion of animal and vegetable protein, digestibility, palatability and the amount of mineral salts present.

To take a few examples, bran and fishmeal could be so mixed as to give the correct albuminoid ratio, but it would be so bulky that a bird would satisfy its appetite long before it had eaten enough to maintain its bodily requirements. A mixture of ata (flour) and gram meal with a ratio of one to five would be too concentrated, and the excessive amount of vegetable protein would cause indigestion and also it would be unpalatable. No one is likely to feed birds solely on either of these two rations, but the following mash appears at a glance to be fairly well-balanced:—2 parts (by weight) wheat bran, 3 parts ata, 1 part meat. This formula would be satisfactory for birds on unlimited range, but if fed to birds kept in confinement it would require the addition of carbonate of lime, common salt and bonemeal. The substitution of a good brand of fishmeal for the meat would also correct the formula.

A mash could be made containing cheaper ingredients such as rice bran, bajra meal, rice meal, jowar meal, with the addition of gram meal and fishmeal to supply protein, but whether it would be suitable for egg production, and the correct proportions required, would have to be discovered by test. It would probably produce very anaemic looking eggs, owing to the absence of maize meal.

MISCELLANEOUS FOOD.

Besides these the poultry food should also consist of animal foods, such as, bugs, worms etc., if good results are expected.

Poultry business may prove a failure if sufficient grit, charcoal and oyster shells are not provided to the fowls. Although grit is not a part of the ration, yet it is essentially required by them for grinding up the grains in the gizzard. Charcoal is an excellent aid to digestion and a good blood purifier. It may be fed in granulated form along with grain or it may be given in powdered state with the mesh.

WHAT FOWLS DRINK.

A plentiful supply of clean fresh water is of much importance. Laying stock especially needs a large quantity of water. The water-vessel should always be kept clean, otherwise contagion may take place.

Generally speaking the supply of drinking water, given to poultry of all kinds, is insufficient. On a warm day a full grown fowl will consume on an average about quarter of a pint of water. This is not surprising when one considers that the amount of water in a fowl's body varies from 55 to 75 per cent. of its weight. The withholding of water is attended, indeed, with more quickly fatal results than the withholding of food.

Many hens lay badly because they are limited in their drinking allowance. Water vessels frequently become dry, and may not be refilled for hours. Whenever a number of fowls are kept the number of drinking vessels could doubtless be doubled with the greatest possible advantage.

MENUS.

Many people feed their poultry on paddy only, and expect eggs, which is an impossibility. In the mofussil it is

sometimes difficult to get all the various grains we see advertised in books, but we shall usually find substitutes among the local feeding-stuffs that will answer the same purpose. One important point to remember is that all fattening or starchy foodstuffs and rice, maize, millet and barley come under this category and need balancing with animal food in some form or other. Meat or fresh fish, cooked and minced up, fulfils these requirements. Again, as it would be expensive and unnecessary to feed grain and meat only, we increase the bulk of the food by adding bran and green food. The following alternative menus are given, in the hope that they will suit the local requirements of poultry farmers:—

Early Morning. Scratch feed of equal parts of paddy and cracked gram, at the rate of 1 oz. per fowl.

Mid-day. A mash consisting of 2 parts (by measure) wheat bran, 3 parts wheat ata, 1 part maize flour, $\frac{1}{2}$ part gram flour, $\frac{1}{2}$ part meat or fish. Vegetables at pleasure.

Evening. One oz. per fowl, or more if hungry, of cracked maize.

If you cannot get the above try:—

Early Morning. Equal parts paddy, and any millet, such as bajra, jowari, etc.

Mid-day mash. Three parts rice bran, 2 parts millet flour, $\frac{1}{2}$ part dhal, 1 part meat or fish. Vegetables at pleasure.

Evening. Any mixture of grain that can be obtained locally. One ounce per fowl.

Feed all grains buried in a litter of dry leaves, straw or sand, as the exercise is so very beneficial to all poultry. Never feed, on the bare ground. The

mash can be fed in hoppers in a dry form, and if this is done the mash should be before the birds from 12 to 3 p.m. If given moistened with the liquor from the cooked meat or vegetables let the birds eat from troughs, as much as they can clear up in ten minutes. The mash should never be made wet and sticky. Just moisten it enough to make a crumbly mixture. You cannot give too much green food, it is excellent for all fowls, and they love having a cabbage or a bunch of lucerne tied up to a string just out of reach, to jump for. Try it and see for yourselves. A plentiful supply of clean, cool water is a necessity, and as each fowl can put away about half a seer of water each day, don't stint the supply or eggs will decrease in number.

To make provision for the hen to shell her eggs properly, give her crushed limestone or shell grit. The latter can often be made from shells found in riverbeds or tanks. Oyster shell is best of all.

Attention to these small details spells success.

FOOD FOR GROWING CHICKENS.

The whole art of rearing chickens till they reach pullethood is both difficult and risky. The greatest mortality in chicks is before they get 5 weeks old and so some people are of opinion that it is better to buy them when they are but six weeks old.

Six weeks old chicks are known as "Growing Chickens." They must be given plenty of food rich in proteid matter. A good range must be placed at their disposal so that they may run about here and there picking food for themselves. Usually a light breed matures in its sixth or seventh month.

FOOD FOR LAYING HENS.

Great care must be taken of laying hens, for both the size of their eggs and their laying powers depend on the nature of food supplied. No doubt the kitchen and table waste can be given to them but that only forms part of the "Balanced Ration." No diet is complete without carbohydrates and proteids and a "Balanced Ration" is such that gives these two main ingredients in proportion most suitable to enable the birds to carry on their various functions. When the hen is in full lay it requires a ration containing 1 part of albuminoid to every $4\frac{1}{2}$ parts of carbohydrates; at other times even 1 in 6 or 1 in 7 will be sufficient. 2 oz. of wheat bran will satisfy the above needs. There must be a supply of pure water at all times and provision should be made for the birds' "Dust bath." For this purpose a wooden box 2' square with six inches layer of dry earth or sand must be supplied.

After the second laying season is over we must select the best layers of the flock for breeding purposes. The others can be killed or sold.

CONCLUSION.

Since the egg-laying capacity of a hen declines after two years, it is usual to renew the stock of fowls every second year. By growing annually about as many young birds as there are hens we can keep up the number in the flock. As yet no methods of sex control have been found out and so if we desire to have 12 hens we must hatch about four times as many eggs.

For hatching purposes we must have "Broody hens." When a hen shows its inclination to incubate or "sit" we call

it a broody hen; such a hen of moderate size can cover as many as 13 eggs. They must be supplied with grain, pure water and a place to dust during their "sitting" period. Eggs usually hatch in from twenty to twenty-two days.

For 26 hours after hatching no feed whatsoever need be given to the chickens, as nature has already provided enough for that period. Healthy chicks need little more than some sort of easily digestible soft food like moistened cracked grains. They must always have a free supply of pure water. The chickens will be ready to leave their foster-mother when they are about two months old. At this stage the sexes must be separated.

CULTIVATION OF COCONUT TREES.

THE coconut is essentially a tropical plant and while it can grow up to the 25th. degree N or S latitude, but it rarely ripens fruit in the extreme limits of its region. From the Bay of Bengal it follows the Gangetic basin inland some 200 miles, but on the coast of India it generally does not penetrate far more than half that distance.

The coconut palm grows effectively on low alluvial flats near the mouth of rivers, which are occasionally subjected to light inundations.

The climate should be tropical and preferably maritime, for the palm delights in the saline atmosphere of the sea. Some inland planters make up for this deficiency by putting salt with the seedlings when planting out. Salt manuring, however, is a debatable question, for it is shown beyond doubt that given a calcareous soil, coconuts grow as

well inland as near the sea, the presence of lime in the ground being essential.

Over low-lying lands peaty soil often exists, and provided the land has been well turned previous to being planted, drained and limed, to destroy the deleterious acids which have been formed owing to stagnant water lying on or close to the surface for a long period, the trees thrive very well indeed.

From 60 to 80 inches of rainfall per year evenly distributed is what suits the coconut tree best, though it will thrive well on less—but not below 50.—if the soil is free and roots can travel easily in search of water; more than 100 inches of rain is said to produce more leaf and less fruit.

PREPARATION OF THE LAND.

The land having been selected for coconut cultivation is cleared off the shrubs and burnt. Then it is advisable for rooting up all tree stumps so as to prevent the development of pug, termites, and other insect pests. These pests attack living or dying trees, and the danger lies in the half-dead trees on the estate after the burn. Some planters hold that stumping should be done at the outset; others advocate a year or two after planting; whilst some take the risk of disease and allow the stumps to rot away.

The ideal plantation is, of course, freed from stumps and fallen timber before planting is begun, the real danger from disease is during the first year. After that time the stumps or timber have reached such a state of decay as to be immense from the attacks of pests, except beetles, and can then be left to rot away.

VOL. XXVI. No. 305.

LINING.

There are differences of opinion as to distance at which trees should be planted, but the popular space is a square of 30 feet by 30 feet, which gives 48 trees to the acre. This distance allows for the interplanting of catch crops, and moreover, the palm branches, which at maturity are 16 feet to 18 feet in length, do not interfere to any extent with those of a neighbouring tree.

DIGGING THE PITS FOR PLANTING.

After the ground is thoroughly cleaned, the pits for planting out the young plants should be dug. The larger the pits are the better, but a 2 feet cube is generally considered sufficient. All the soil removed from the pits should be replaced by good surface soil to within 6 inches of the top. When this work is finished, the young plants, which should be from five to seven months old before being removed from the nursery, may now be placed in these holes, leaving the nut of the seedling about 6 inches to a foot below the surface and just slightly exposed. When the plant has come well away, say with about a dozen well-grown leaves on it, the holes should be filled to the top with good surface soil.

DRAINAGE,

Drainage is the most important factor but where the land is undulating in even slopes, little or no drainage is required. In the low flat alluvial soil, drainage is of considerable importance and it is always advisable in this case to have drains dug all round the spot selected for cultivation. This is especially the case where the soil is of a peaty nature. In this way it is of advantage to keep the land exposed for as long as possible, say

at least six months, after which attention should be paid to further drainage, if necessary.

CULTIVATION.

For seed purposes ripe nuts should be chosen from trees of mature growth but not too old. After being kept from 4 to 6 weeks seed nuts are planted in a nursery bed heavily manured about one foot apart. Ashes and salt are freely scattered in the trenches as manure and as a protection against insects. The seedlings thus obtained are planted out from 2 to 6 or more months later, preferably at the beginning of the rains. In Java and Malaya seed nuts are tied in pairs by a portion of the outside husk and then hung from a stretcher supported at a height of 6 feet from the ground in a sheltered spot. The shoots and roots soon appear, and the young plants are ready to be removed for planting out at a definite period.

From nursery bed the seedlings at the age of 5 or 6 months are transplanted to the permanent field. When the seedlings have become firmly rooted in the ground, very little cultivation is required beyond keeping the land free from weeds.

For stirring up the soil round a tree, or for manuring the best implement is the Assam fork; it is spade shaped with strong steel prongs and handle. As the trees grow in age, the radius of the circle dug up will also be increased—for one-year old trees 2 to 3 feet from the stem of the tree will be found sufficient, for two years old trees the radius should be increased to 4 feet; and so on; the circle dealt with in this way, when the tree reaches maturity and is in full bearing, is about 8 feet from the stem.

MANURING.

Except to stimulate a lagging plant, manure should not be applied to young trees, for a field should be allowed to demonstrate what the soil can do for them before attempting to force them. The trees may be strong, but late of coming into flower, and when they do bear, the crop may be disappointing, or it may be in excess of the tree's strength, and a large percentage may drop at different stages or growth. The first case calls for phosphates, and the second for nitrates.

The best manures for coconut trees are cow dung and salt mixed; fish refuse; bone dust; guano; castor cake; poonac.

Cattle manure is undoubtedly excellent, as it adds humus to the soil, and, much in the same way as lime, it binds a loose soil, and renders friable a hard clayey soil.

A very successful manure mixture used in Ceylon is in the following proportions—

200 lbs. rape cake.
150 lbs. fish manure.
200 lbs. bone phosphate.
50 lbs. sulphate of potash.
300 lbs. kainit (contains 30 per cent. salt).

This applied at 10 lbs. per tree costs, including transport and labour, about 8d. per tree.

Many planters favour semi-circular manure trenches at a few feet from the stem, but in the digging, the primary roots or lateral feeders are severed to the depth of the trench, and the tree to that extent is cut off from its accustomed feeding ground, and must depend on the artificial application.

The roots of the coconut tree are more vigorous toward the extremity of the primaries, and diminish gradually in strength toward the stem; therefore, manure placed in ploughed furrows between two lines of trees, or equidistant 15 feet from the stems, finds its way more rapidly to the tree by means of the natural feeders than in a trench of cut roots at 6 feet from the stem.

PROTECTION AGAINST INSECT PESTS.

The coconut palm is frequently infested with various kinds of insects, such as caterpillars, butters, moths, weevils, borers, etc. These can be kept well within control, and do comparatively little harm, by the ready and frequent use of kerosene emulsions and arsenical solutions, applied by means of a spraying machine.

YIELD.

Coconut palms bear fruits, according to the locality and the care expended on them, in from 5 to 10 years. They throw out a spathe and a leaf every month and each flowering spike yields from 10 to 25 nuts. The yield varies according to the soil, climate, care expended, and also variety grown.

Before concluding this article we must mention here the different uses of coconut.

There is no plant on earth that has so many uses for humanity as this wonderful tree. It affords food, drink, clothes, house, and many other important necessities of life.

The roots furnish—a remedy for fevers.

The trunk—wood for boat-building, temporary bridges, furniture, etc.

The leaf—thatching, baskets, torches, hats, mats, sieves,

The stalk—combs, brooms.

The flower and cut flower stalk—a medical astringent, toddy or palm wine, arrack, jaggery, sugar, vinegar.

The husk—coir for ropes, mats, cordage, brooms, bedding, brushes, paper pulp.

The shell—lamps, fuel, drinking vessel, kitchen spoons, charcoal, rubber latex cups.

The kernel, commercially known as copra—oil, cattle feed, nut butter, soap, food products, candles.

The milk—a delicious beverage.

UTILISATION OF MOLASSES.

IN the near future economic thinkers foresee, not without sound reasoning, that an increase will take place in the outturn of cane-sugar along with its molasses in India. This expectation is based on recent events such as the protection afforded to the Indian Sugar Industry and the restriction placed on the export of foreign sugar by the Chadbourne Scheme. By these two scale measures, India is faced with the immediate problem of utilizing her surplus molasses profitably as otherwise her sugar industry can hardly develop.

Molasses is now consumed in India chiefly as a food-stuff mixed with gur by the rural population yet the unlimited and abnormal expansion of such use by the lowering in price of this food-stuff cannot be expected. Molasses is also largely used in the making of indigenous tobacco and country liquor, but it is undesirable that these two unessential or luxurious uses should be

augmented. At the same time the profitable export of our molasses to foreign countries cannot be hoped for owing to the obvious over-production of sugar and this bye-product all over the world.

In these circumstances the most economical outlet for our surplus molasses lies in the manufacture of industrial spirits, mainly in the preparation of the fuel spirit used as an admixture with motor oils. Petrol is still rather expensive in India although automobilism is fast expanding in the country. The economic prospect would consist in manufacturing with a bye-product of diminishing value, a new fuel consumed by a branch of transportation that is fast extending in a sub-continent.

ENDLESS PRODUCTS MADE FROM MOLASSES.

The many intoxicating liquors and industrial spirits made from molasses are known to chemists by the generic name of "alcohol." Though put to both good and bad uses, industrial chemistry would have made but little progress without this basic "alcohol." Huxley is reputed to have once observed that it was a curious speculation to think what would have become of modern physical science (including chemistry) if glass and alcohol were not easily obtainable. Without recounting the utilities of glass, if we were to recall the endless purposes for which alcohol is needed in chemistry, we could not regard this dictum of the great scientist as an exaggeration of facts.

Alcohol is used for endless purposes in industries. Among its other uses may be named the solution of spirit and resin to prepare furniture polish; the solution of spirit and dye-stuff to prepare paints,

enamels and varnishes; the spirit varnish that is used as a stiffener in making felt caps and hats; and the alcohol that is used as a solvent to incorporate the raw materials, so as to bring them into a plastic workable condition in the making of celluloid, xylonite, etc. Alcohol is also used both as a solvent and as a raw material in making explosives, gun-powders and fulminates. In making fulminates, alcohol serves as the basic material not as a solvent. It is destroyed in the process of manufacture and does not exist as alcohol in the finished product.

Moreover, in soap-making alcohol is employed as a clarifying agent. Dry soap is dissolved in spirit, separated from insoluble impurities, and most of the alcohol distilled off. The residual mass is then shaped into bars or cakes and stored at the ordinary temperature, when the remaining alcohol slowly evaporates and leaves a transparent soap. Again, collodion is made by dissolving gun-cotton in a mixture of alcohol and ether. Incandescent mantles are coated with this collodion as otherwise they would be too brittle, for transport.

Alcohol forms the raw material in the making of ether an important product. A mixture of alcohol (5 parts) with strong sulphuric acid (9 parts) is heated in a still to the temperature of 130°—140°C. (266°—284°F). The acid reacts chemically with the alcohol producing ether which distils over and is purified subsequently.

Like ether, chloroform is used largely as an anaesthetic and a solvent. Chloroform is made by distilling alcohol with bleaching powder, or by first pass-

ing chlorine gas into alcohol and distilling the product with bleaching powder.

Two other anaesthetics, ethyl chloride and ethyl bromide are made by distilling alcohol with hydrochloric acid in the case of the former and a mixture of sodium bromide and sulphuric acid in the case of the latter. The former is also used in making certain dye-stuffs and chemical products.

Alcohol is also used in preparing surgical dressings, embrocations, liniments, alkaloids and fine chemicals. It is also utilized largely in the manufacture of hair-washes, aniline dyes, artificial silk photographic plates and other endless products of modern industry.

As a fact, a good deal of alcohol has actually been used as motor fuel. No doubt much remains to be said and done before the perfect alcohol engine is evolved; but the matter has passed out of the purely experimental stage. In general the alcohol is mixed with other liquid fuels, of which the principal are benzol, petrol and ether, though others, such as acetone, kerosene and fusel oil alcohols, have been advocated.

—BY H. H. GHOSH.

THE DRYING OF FINISHED CIGARETTES.

WE published in our May 1935 issue an article on modern Treatment of Cut Tobacco which, we feel sure, must have captured the interest of our readers.

To-day we are in a position to bring some further interesting news about the latest method of drying finished cigarettes. This consists of an entirely new equipment, which keeps pace with a modern progress, enabling manufacturers

to produce cigarettes on more economical and practical lines, while at the same time the product as such is undoubtedly improved.

One of the most important problems in the manufacturing process is that of the correct moisture content of the cigarettes resp. to find a way to bring the moisture content to the desired degree. It is essential that the cigarettes leave the factory in an always even condition as to quality, moisture-content and aroma.

In modern cigarette factories this problem has most satisfactorily been solved by the installation of special Cigarette Drying Plants, which are described in the following:

On leaving the Cigarette Machines, the cigarette trays are immediately transferred to the Drying Plant by means of a continuously moving conveyor and placed in the Drying Chamber, which, after the drying process, releases them automatically. Special sluices at the inlet and outlet ends of the chamber prevent any influx of room air and any escape of the drying air. Whilst in the drying chamber an air current flowing at moderate speed (previously dried by a special process) plays evenly around each cigarette and extracts a portion of the moisture added to the tobacco during its preparatory treatment. The degree to which the moisture is to be extracted depends of course upon the existing condition and individual requirements and can be regulated accordingly. The air current which absorbs the moisture from the cigarettes is continuously sucked off and directed to a regenerator where it is dried by means of a special filler

material with special water-absorbing powers. After working hours, the filler material, by means of heated air and a subsequent cooling down process, is regenerated within a period of 4-6 hours, thereby ensuring that the Plant is again ready for use the following morning.

The capacity of such a drying plant is about 2-2½ millions cigarettes per normal working day, all according to the size of the cigarettes and the holding capacity of the trays.

Under normal circumstances the drying process lasts only about 5 minutes. From the foregoing it can be seen that within a very short time after leaving the machine and passing through the drying plant, the cigarettes are perfectly suitable for packing.

The following important advantages resulting from its use should therefore be obvious to every manufacturer:

- (1) The cigarettes can always be brought to exactly the moisture content desired and this without the least outside influences.
- (2) Storage of the cigarettes in trays is eliminated, seeing that already a few minutes after the manufacturing process they can be packed ready for distribution. An escape of the characteristic aroma is quite impossible.
- (3) Saving of space by elimination of the tray store.
- (4) Shortening of the whole manufacturing process by at least 2 to 3 days.
- (5) Saving of interest on the value of the cigarettes during the time they would remain in the drying room.

- (6) Quicker service to customers.
- (7) Better facilities for the Factory Management to regulate and dispose of the daily production seeing that the cigarettes can be despatched on the day they are manufactured.

Till now there are no such plants in India, as indeed they have only very recently been added to and thereby perfected large plants in Europe.

This plant should be of special interest to our cigarette manufacturers, many of whom do, due to our climate, suffer heavily, either through periodical or permanent excessive moisture in the air, all of course according to the districts in which their factories are located.

Constructors of these Plants are Messrs. J. C. Muller, N. V. Rotterdam (Holland), who are at all times ready to submit further details and non-binding estimates on receipt of enquiries from interested parties. Their agents in India are T. V. Lynn & Co., 58, Forbes Street, Fort Bombay.

Fire is extinguished much more quickly by salt water than fresh.

Boot polish which has become dry can be successfully softened with a few drops of turpentine.

Silver can be cleaned by putting it in hot soda solution in contact with aluminium.

To prevent silver from turning dark, place pieces of gum camphor into the drawers in which the silver is kept.

Gold and silver ornaments can be kept from tarnishing if they are carefully covered from the air with box-wood sawdust.

Classification of Wool and Hair.

ROUGHLY speaking, sheep from the points of their wool are divisible under three main groups; the merino and those approximating to it, where the wool is fine and soft; secondly, the innumerable half-breeds and cross-breeds, whose wool is of good quality but coarser than that obtainable from the merino; and thirdly, those whose wool is mainly used for carpets, as, for example the Oriental sheep.

British wools are classified as lustres, demi-lustres, downs, half-breeds, and mountains and these are again divided into two chief classes—namely, long and short. Of the lustre wools, Lincoln, which is the longest and strongest is a characteristic example. Its staple is 12 inches. Another typical lustre wool is Leicester, its staple being 10 inches. These types of wool are generally used for dress fabrics, braids and linings.

In demi-lustres the characteristic types are Irish Hogs and Irish Mountains. These two examples must be regarded as characteristic of many other demi-lustres. They are mainly used for dress fabrics.

Characteristic examples of medium and short wools are Down Wools Southdown (Sussex) which is the shortest and smallest fibred wool in England has a 3 inch staple; Shropshire Down, which resembles Sussex Down but is not so fine, has a $4\frac{1}{2}$ inch staple. These types of wools are mainly used for hosiery and cheviot cloths owing to the fact that Down wool is usually of poor felting quality.

There are a number of Spécial wools, of which the two following are the

extreme examples; the Cheviot and Blackfaced.

A typical example of half-breed wools is "North," a cross between Border Leicester and Cheviot. It is by far the most important and valuable and is usually classed as demi-lustre wool.

There are many other well-known crosses such as Downcheviot and Leicester North. These, however, are not used for breeding. The beasts are slaughtered as soon as they reach condition for the butcher, and the wools are chiefly from skins.

Quite a considerable business is done in what is known as skin wools, and these are obtained from the fell-mongers—that is skins removed from the sheep which have been slaughtered. Although when proper methods are used wool of good quality can be obtained from such skins, often, owing to unsatisfactory treatment and lack of proper sorting, such wools are found to be only suitable for medium and low class goods. The usual defects noticeable are lack of spinning properties—they are dead and harsh and do not dye or mill as well as fleece wools do. They are three main divisions: (1) Skin wools, sun-dried and removed from the skin by a process of sweating; (2) Skin wool, separated by a chemical agency, the most usual being by sodium sulphide; (3) Stepe wools, these are removed from the skin by the application of lime.

The usual type of skin wool comes from cross-breeds but there are also a number of merinos.

In addition to wool certain hairs are employed in a similar way, of which the

chief are mohair, alpaca and cashmere. There is also a limited demand for camel's hair and cow hair. Mohair is produced in two main areas, one being Angora in Turkey and the other source being in the Cape but the latter is as a rule slightly inferior. Other sources of supply are the U. S. A. and Australia. Most of these mohairs are used in the production of dress-lining fabrics and plushes.

Alpaca comes from the peruvian goat. It is used almost entirely for dress fabric and linings.

Camel's hair comes mostly from China and Russia and cow's hair is the only other hair used on a large scale. It is used in the making of carpets, rugs and druggets. There are a number of other hairs used, such as rabbit's hair, horse hair, and even kangaroo hair. Horse hair of course, is mainly used for upholstery, where there is a considerable, though specialised market.

LETTERS THAT PULL.

IN the sphere of business well-written letters have achieved great success and are drawing a steady and continuous orders.

Now what is the essential factor in a successful sales letter? This seems to have failed to draw as much attention as the subject deserves and that is the reason why the majority of the letters written is barren of results and ends in nothing useful. On an optimistic estimate the number of successful letters does not exceed half-a-dozen in a couple of hundred letters. In other words, less than one in thirty has secured a hearing through their letters. Why so much waste of time, energy and money when a systematised knowledge can enable any one to write highly successful

letters? Letter writing has been brought to the level of a science and with care the number of useful letters can be easily increased. We lay down the principles which all letter writers follow in attaining the highest standard in their art.

A critical study of more than 5,000 sales letters would lead to the following conclusions:

LOGICAL PLAN.

For the letter-writer who desires to produce results, no study is more necessary than the study of logical plan. He must know how to manage it and subordinate it; his machinery must not creak and groan and obtrude its cogs and levers; but when he invites us to step abroad the train of his thought, let him cushion the seats and call our attention to the scenery if he will, or we shall be humped out of our mental security.

If he expects to move us to action, he must follow the brain paths along which we are accustomed to travel. One of the reader has been persuaded to commit himself to it he is more willing to go through to the end. Once he has stepped abroad the train, he does not find it so easy to get off.

SETTING THE PRINCIPLE FIRST.

Let me take first the "general to particular" form of letter, one variety of which consists of setting forth a principle to which the reader will assent, and proceeding to draw conclusions from it. Here is one:—

"The Fight for Truth in Advertising develops big men."

"This newspaper has one of them:—
—Mr. Thos. Adams. It is getting another, Mr. Jonathan Smith. Mr. Smith joins our staff on June 1st. We like him. We like the things he has done, and we believe you will, too."

"The field of truth in advertising is broad. Messrs. Adams and Smith have covered a considerable part of it. They are going over the rest together. Watch their progress in this newspaper."

It is the first sentence that has caught your eyes, particularly if you have done a bit of fighting yourself, and you read the rest because your interest has been roused.

AN EASILY ACCEPTED TRUTH IN THE FIRST PLAN.

If the first general statement is an easily accepted truth from which conclusions are formed, all is well; but it may be one challenging the reader's belief for an instant, before the evidence is presented. Another letter says:—

"Shut that door; It's cold; It is hard to heat this house."

"Did you ever say that? Are there parts of your house that are hard to heat when there is a cold wind blowing outside, when it's stormy, or in the early autumn before it is really time to start the fires?"

"Here is a picture of a fine little electric stove at only £3 10s."

Particularly if you yourself have felt that draught you will be attracted by this appeal. And what is true of electric stoves is true of a hundred and one other things.

Most of these generalisations followed by specific conclusions or instances have been at the beginning of letters, where they formed the point of contact with the existing interests and beliefs of the customers.

At any turning point within the letter, a generalisation may be introduced to catch and hold assent for a moment. But it seems less likely to make its appearance here than at the beginning. This is partly because a letter is likely to be written on a single point, and partly because after the letter has been started, and has caught the reader's attention, it hurries along at a pace which permits no delay, and introduces no assertions which will not meet with unchallenged assent.

A single article offered as an example of a merchant's stock a single instance of service to show how a firm is equipped to

satisfy all your needs, a single lacking point used to concentrate the reader's attention—these are familiar examples of this type of thought-development.

THE CHAIN OF CAUSE AND EFFECT.

What is more compelling than the chain of cause and effect? In nearly all sales presentation there is first the known cause, the merit of the goods, then the effect—you ought to buy. This connection in the letter is usually implied rather than stated step by step, however because the writer at the end of his letter is so busy presenting persuasion and multiplying appeals, in his endeavour to secure action, that his appeal is usually suggestion or command, rather than a definite and logical conclusion.

The "Consider what this means to you" argument is constructed on the line of cause to effect but writers of sales letters seem to have a passion for presenting results first and then calling on the reader to witness the cause. One letter of this type starts in this way:—

"You can learn more from carefully studying this book than experience can teach you in years, simply because it does not give theories; it presents facts."

Then, of course, follows an enumeration of the facts.

Another letter opens:—

"Has it ever occurred to you what an economical arrangement it would be to attach direct to your garage that greenhouse you have so long wanted. One boiler would heat both garage and greenhouse, with a saving for both."

Like Aladdin's palace, the vision rises before us of what might be or what actually exists for some other fortunate fellow, and we listen readily to the rest of the story—shown above.

UNPLEASANT RESULTS SET FIRST.

The familiar "predicament to remedy" form of letter shows us results—unpleasant results, and if necessary shows us the cause but usually the salesman mercifully passes this over to paint the happy picture of the remedy.

"You need hot water practically every hour of the day and nearly as often by night. Banish all hot water bother by installing an automatic gas circulator."

IN THE INSURANCE FIELD.

BY OUR INSURANCE COMMISSIONER.

Insurance—A Long-distance Thought.

Sir Ernest J. P. Benn, presiding over the annual meeting of the United Kingdom Provident Institution, made a very interesting and useful observation on the benefits of insurance. He said in part as follows:—(1) The disturbed condition of the world is not alone due to mistakes in public administration, but also and perhaps more to a very general forgetfulness of the economic and even the ethical and moral foundations upon which social well-being depends. In repairing that forgetfulness the world might do worse than examine the principles upon which institutions like our own are founded, for they are very closely related to the essential principles of the good life, using "good" in the very widest sense of the term. Insurance thoughts are long-distance thoughts and have a better perspective than the hand-to-mouth opportunism which tends to absorb so much of our attention in public affairs. Insurance recognises that sacrifice which must come before benefit, and denies the wisdom of a policy of something for nothing. That is a thought which might with great advantage be more widely applied. Insurance affirms that the future is more important than the present in any plan of life which includes progress. In a leading article, the SPECTATOR has the following refreshing and vigorous paragraph. A day by day chronicle of life insurance would yield a vivid and varied story, a veritable rainbow of human life. Every walk of life, every strata of society, "rugged youth and crabbled age," the man in rags and the man with riches, the woman in tears

and toil and the woman with the memories of love would contribute to its making. From its pages the ring of gay laughter rises above the dreary dirge that comes from despondency and despair.

Outstanding Investments.

There is no question about the important part which life insurance investments play in our social and economic structure. They naturally flow in the direction where there is the greatest need. During the period of railroad expansion, substantial sums from life assurance reserves were invested in railroad securities in America, during the post war period when there was a shortage of housing for both business and residence, funds were used to a very substantial degree to aid in alleviating the shortage; and occasionally when the Governmental departments were in need of support life insurance funds were invested in their obligations. Policyholders' financial needs vary with economic condition. The experience of the depression through which we were emerging has emphasised the importance of a measure of liquidity not heretofore anticipated. The abiding financial strength of the institution of life insurance rests upon its ample reserves, strong cash position, and the character and selection of its investments. There is a striking parallel between the fundamental theory of life insurance which is predicted upon the spread of risks on lives insured, based upon acceptable tables of mortality and, on the other hand, the spread of risks in investment, exemplified by the wide diversification of investment holdings, each based upon

real character, with all speculative hazards eliminated. A life insurance company is, in effect, a trustee, and as such is bound to exercise extreme care in investing policy-holders' funds. The restrictions imposed by law are supplemented by the exercise of judgment on the part of the management.

Annuities Supersede Life Business in America.

The news that nearly 56% of the new premiums paid to twenty six of the large life insurance companies during 1934 was for annuity business unmistakably shows that annuities are becoming increasingly more popular in America than ordinary life business. The reason for this is indicated in an illuminating leading article by the Editor of THE SPECTATOR (New York). The preference for annuities of the American people is explained as due to their seeking a safe, conservative and durable investment. "Stress, politically and economically, is placed currently upon old age security. That every man should turn to life assurance, who would build his financial house firm and livable, is quite the expected result of an unblemished record of protection service through the years which nearly reach a century. The man who would seek old age free from the adversities of life, through public print and radio discourse, is first impressed with the fact that this may be accomplished through pension or annuities." In India the source of new premium income through annuity business has not yet been fully realised, far from being cultivated. Very little propaganda has till now been done for encouraging the annuity business. Perhaps the technicalities of this particular branch of insurance have not been fully mastered by the agents, neither are they taught by the managers. As it appears likely that a vast field remains to be explored in this business, the companies as well as underwriters would do well to lend their serious thoughts to the encouragement of annuity business.

New Legislation in Egypt and Cuba.

Protection and autarchy characterise

the policy of insurance legislation in all those countries where the business is of considerably recent growth. In the columns of this journal have been published reports showing the trend of legislation in several countries. Egypt and Cuba are the latest protectionists. A new Bill in Egypt which applies to both home and foreign insurance companies with the exception of marine and reinsurance offices, requires all companies to be registered and to deposit E £10,000 for each class of business transacted, with a maximum of E £30,000 if three or more classes are transacted. Foreign companies must give power of attorney to their agents, and agents and other intermediaries must not have been convicted of a criminal offence or be undischarged bankrupts. A consulative insurance committee is to be established at the Ministry of Finance, and insurance companies will in future be subject to certain conditions of supervision and control and must furnish accounts to the committee according to prescribed schedules. The Cuban project is stricter and resembles the Italian law very closely. It provides that national and foreign joint-stock companies operating in Cuba shall have an official domicile in Cuba with a local organisation, either in the form of a committee or a board of directors having full powers to represent the company locally in all legal matters. Not less than one half of the members of this local organisation must be Cuban citizens and the secretary must be a Cuban citizen and a lawyer. In order to have validity or legal effect in Cuba, approval by majority vote of this local organisation must be given to all decisions of the company regarding alteration in capital, reduction or suspension of dividend or interest payments, redemption of debentures, acquisition or conveyance of real estate and contracting of loans, etc. It is presumed, however, that this can only apply, so far as foreign companies are concerned, to their Cuban organisation and business. Companies not complying with the law within specified terms are subject to fines, and thereafter are considered in a state of dissolution.

SMALL TRADES & RECIPES

Chewing Gum.

White wax	1 part.
Paraffin	1 "
Tolu balsam	4 parts.
Benzoin	1 part.
Sugar	1 "
Flavouring matter	q.s.

Melt the gums, etc., together, and, when fluid, stir in the sugar and flavouring matter. When cool enough, roll into sticks or cut in dice.

Shoemaker's Heel Balls.

Beeswax	2 lbs.
Suet	3 oz.
Ivory black	4 "
Lamp black	3 "
Gum arabic	2 "
Rock candy	2 "

Melt together the beeswax and suet and then stir in the remaining ingredients. When partly cold pour into tin or leaden moulds.

Red Marking Ink.

Silver nitrate	24 parts.
Tartaric acid	30 "
Gum	20 "
Carmine	1 part.
Ammonia	q. s.
Water	40 parts.

Macerate the silver salt and tartaric acid in a perfectly dry state and then add the red carmine previously dissolved in a small quantity of ammonia.

Whitening Tennis Balls.

Light carbonate of magnesia	3 oz.
Benzol	$\frac{1}{2}$ fl. oz.
Liquid paraffin	$\frac{1}{2}$ "
Tragacanth	40 gr.
Methylated spirit	$\frac{1}{2}$ fl. oz.
Water	2 pints.

Mix the benzol, liquid paraffin, tragacanth, and spirit. Add to this, all at once

the mixture of magnesia and water. Shake well. Clean the balls thoroughly and dip in the mixture. Lastly, dry the balls in a warm place and shake together.

Cement to Mount Bicycle Tires.

Bicycle tires may be mounted on wood or steel rims with a cement made by dissolving crude rubber, 2 lbs. and rosin, 2 lbs., in carbon disulphate, 1 gal. The latter is very inflammable and should not be handled near an open flame or while smoking. This cement will keep if stored in screw-cap bottles or sealed cans. To use the cement, clean the rim and apply with a brush. A light coat should also be applied to the rim surface of the tire.

Glue from Leather Waste.

In preparing glue from waste leather, it is first disintegrated with the help of what is known as "Hollander." This is then washed and subjected to an elaborate chemical treatment. For this purpose proceed as follows:—

Dissolve 1½ lbs. of oxalic acid in 20 parts of water. Pour the boiling solution over 1 cwt. of leather waste. Keep the mixture in the water bath at a temperature of 80°–100°C. When the leather dissolves gradually add 25 pints of water until a uniform mass results. Make ready a paste by slaking 5 lbs. of quicklime; add it to the above mass. Mix the whole well. The mass will become friable and powdery.

Rub it through a wire sieve, and expose the still moist mass to the air. Within about a month's time the tannic acid is destroyed and the mass becomes lighter. Remove the lime by means of water and hydrochloric acid. Now by boiling this mass glue can be obtained.

India's Industrial Progress.

Hosiery Manufacturers' Association, Ludhiana.

The statement that of about 1,500 machines employed for manufacturing socks and stockings in Ludhiana, a hosiery manufacturing centre in India, nearly 75 per cent. were lying idle owing to keen Japanese competition, was made in evidence led on behalf of the Hosiery Manufacturers' Association, Ludhiana, before the Tariff Board.

The Chairman and secretary of the Association urged that the apparent increase in sales of Indian hosiery goods should not be taken as a criterion of better profits for the trade and pointed out that their profits had been dwindling since the dumping of similar goods by Japan who were in a position of advantage on account of favourable exchange and other factors like free technical advice, cheap money and lower freights.

The industry, they said, ranked foremost amongst the indigenous enterprises and deserved to be protected from foreign competition till it was in a position to stand on its own legs. It employed thousands of workmen and a very large Indian capital invested in the Indian hosiery industry in Ludhiana was over Rs. 35,00,000 besides Rs. 15,00,000 invested in the general hosiery trade in the form of stocks held by yarn dealers, colour and chemical merchants and dealers in machinery and parts connected with the industry. The workers employed in the industry were

about 5,000. There were also about 2,000 part-time workers. The severest competition was felt from foreign goods that were mixtures of wool and cotton. These mixtures were palmed off by the retailers to the consumers as "all wool" garments as there were no woven labels attached to them. Except with the assistance of experts these were not distinguishable from "all wool" products. They therefore urged that no distinction in the tariff schedule should be made between "all wool" products and goods containing "less than 15 per cent. wool." They suggested that the duty on both these varieties of goods should be the same. The maximum capacity of their plant and equipment, the said, was four times present output, but unfortunately they had no work to keep the factories busy throughout the year. If sufficient protection was granted to the industry, they were sure to improve their methods of production and thereby reduce the manufacturing cost by 4 to 5 per cent. annually. They also made a plea for concessions, in railway freight being given to the industry. They pointed out that the railway freight from Ludhiana to Calcutta was Rs. 4 per maund, whereas the shipping freight from Japan to Calcutta was less than one rupee.

Indian Glass Industry.

The sympathy of the Government of India towards the development of our

indigenous industries has been amply demonstrated by their attitude in regard to the glass industry. The industry wanted protection in the year 1927, the matter was referred to the Tariff Board for examination in 1931, the Board recorded their findings on March 17, 1932, the report of the Board was printed in 1932, and it has been published on the 22nd June 1934. Of course the resolution of the Government of India upon the recommendations of the Board has been released simultaneously for publication. The resolution again is wonderful in its ingenuity. While the Tariff Board opine that the industry has definitely established its claim for protection, the Government of India are unable to accept the finding. The Government of India certainly deserve congratulations for having been able to arrive at a decision after a deliberation extending over a period of two years only!

The first of the conditions laid down by the Fiscal Commission which should be satisfied by an industry applying for protection is that it must possess natural advantages in the form of an abundant supply of raw materials, cheap power, a sufficient supply of labour and a large home market. Having failed to find out any flaw in the Board's findings the Government have discovered after two years' cogitations that soda ash, which is imported from abroad, is the chief raw material of the glass industry and it represents 70 to 75 per cent. of the total cost. The conclusion is that it does not, therefore, satisfy the requirements for protection! The Government of India have, however, been kind enough to show some mercy to the industry. They have

decided to remit the import duties on soda ash actually required by the glass manufacturers. They have further promised to re-examine the case after a few years. We hope they will then be able to calculate the cost of soda ash more correctly after deducting the costs of import duty and freight charges.

Research Work in Rice.

A great fillip to research work in rice in the United Provinces has been given by the opening of a research centre at Nagina, an important place in Northern U. P.

In this connection it may be mentioned that rice is an important crop over seven million acres and forms the staple food of about 75 per cent of the population. As long ago as 1924 no systematic study of the crop was made in these provinces. The situation was complicated by the fact that variety of rice ordinarily grown were mixtures of various distinct types. The worst feature of the situation was that in many cases the same variety was grown in different localities under different names, while in other cases different varieties were known by the same name in different localities.

The economic botanists, have, in the course of the last few years, succeeded in removing this confusion of names and in isolating pure single line types which constitute the bulk of rice grown in the U. P. And now it is possible to isolate about 135 distinct types after discarding the duplicates.

To solve some of these problems a rice research station has been opened at Nagina. A move in this direction was

already made in 1929 when hybridization experiments were started at Cawnpore.

Grading Indian Sugar.

A bureau of sugar standards was recently started by the Imperial Council of Agricultural Research, with a view to assisting in the grading of Indian Sugar.

The first meeting of the Advisory Committee attached to the bureau was held at Cawnpore under the presidency of Mr. R. C. Srivastava, Sugar Technologist, Imperial Council of Agricultural Research for India, when important decisions are reported to have been arrived at.

Assistance To Small Industries.

A resolution of the Government of Bombay states that the sanction of the Legislative Council having been obtained to the scheme of affording financial assistance to small industries, rules have been framed for the grant of loans. The rules come into force from 1st August 1935 and will be printed in the form of a booklet.

The main provisions of rules (called the Bombay State Aid to Small Industries Rules 1935) are summarised below:—

The purposes for which loans may be granted include construction of buildings, wells, tanks, etc., purchase and erection of machinery and purchase of raw materials.

All applications for loans must be made in writing to the Director of Industries, stating the amount and purpose of the loan, the total estimated capital required for running the industrial concern and the time in which the loan will be repaid.

The Director of Industries can sanction loans for amounts not exceeding Rs. 2,000. For loans beyond that amount Government is the sanctioning authority. No loans exceeding Rs. 10,000 will be granted to anybody.

One of the conditions of granting a loan will be that the borrower shall pledge to Government any buildings that may be erected or any plant purchased from the loan money. The borrower must also give collateral security.

The applicant must obtain valuation certificates of his property from the Collector or the Executive Engineer according to whether the property given as collateral security is land or buildings and the applicant must also declare any encumbrance or charge on the property.

Loans will be disbursed in one or more instalments according to the actual requirements of the borrower and they will bear compound interest at the same rate of interest as "taccavi" loans granted under the Land Improvement Loans Act. The period for repayment shall, in no case, exceed 10 years from the date of disbursement of the loan, which will be repaid by instalments fixed in the orders granting the loan.

All sums must be spent in accordance with the objects for which the loan is sanctioned and the borrower must submit within three months a certificate showing the amount actually spent by him and the purpose for which it has been spent and, if he is satisfied that a loan is not being used for the purpose for which it was given, the Director of Industries may order the whole amount to be repaid. The Director of Industries is given power of inspection of the books, etc. of the industrial undertakings in respect of which the loan has been granted.

Training in Shoe-making.

The Department of Industries Government of Bengal have decided in furtherance of their scheme of relieving unemployment among the educated middle class people of Bengal to enlist a fresh batch of students for giving them practical training in shoe-making. Shoe-making is now a growing industry in the country and offers a big field for employment; and it has the additional advantage of being a type of business which is neither difficult to learn nor does require a large capital to start with. Already a number of youths trained by the Department in shoe-making have either opened small factories or have secured employment in the trade.

The classes will be held at the Calcutta Technical School premises at 110,

Surendra Nath Banerjee Road, Calcutta and will be open to the unemployed youths of Bengal who are genuinely keen on starting business in the line on completion of the training. Application with copies of testimonials for admission to these classes will be received only from bona fide residents of Bengal and should be made to the Superintendent, Bengal Tanning Institute, Canal South Road, P. O. Entally, Calcutta, not later than the 15th August, 1935. Candidates must have a good school education and a sound physique.

Shellac Discovery.

A new experiment carried out by the Indian Lac Research Institute at Namkum, Ranchi, which might revolutionise the use of shellac in protective and ornamental castings, seems to have aroused worldwide interest.

Shellac lacquered surfaces possess properties of exceptional hardness, weather resistance and ability to develop a beautiful lustre on polishing.

Experiments conducted at the Institute have established that these qualities are brought about by a slow physico-chemical change which may be accelerated, however, by heat or by certain chemical reagents. It has been discovered that, by a small addition of certain chemicals, it is possible for a shellac surface to attain in a few days or weeks that hardness and weather resistance which hitherto took several decades to develop.

The process is not yet out of the experimental stage but it has aroused considerable interest. Shellac chemists in Germany are enthusiastic about it and are making efforts to put it on a practical footing.

Improving Agriculture.

It is understood that the Travancore Agricultural Department has decided to initiate a programme of intensive agricultural propaganda in limited areas.

The areas thus worked up are likely to form model agricultural colonies. The nucleus from which surrounding areas will gradually be persuaded to adopt up-to-date methods.

Discolouration of Red Marble.

The Indian Lac Research Institute, Namkum, Ranchi, have issued the following information regarding the cause of pitting and discolouration of polished red marble and the methods used to preserve the marble.

The pitting and discolouration of marble linings is due to the absorption of moisture-carrying soluble salts derived either from the cement used in fixing or from the backing materials.

To prevent its occurrence it is customary to treat the back and the joint surfaces of the marble with shellac but often dowel holes are subsequently cut in the marble and shellac coating then becomes ineffective. It is, therefore, important that the fixers should be supplied with a solution of shellac and should be instructed to apply it liberally wherever they have occasion to cut the shellac treated surfaces.

To preserve polished marble the best method is to repolish at regular intervals with beeswax, but it must be realized that this treatment will not prevent deterioration due to access of deleterious materials from the backing.

New Type of Sugar Factories.

Mr. H. C. E. Peterson, a Bengal Government agricultural engineer at Dacca, after years of experiment has devised a small open pan for manufacture of sugar requiring only Rs. 20,500 capital.

The recent tariff concession granted by the Government has given an impetus to the sugar industry, which appears to have immense possibilities in this country, coupled with encouragement given to cultivators by the distribution of over 10,000,000 cuttings.

Several factories of this type have been started—including one at Rajshahi for demonstration purposes—by the Government and others in various districts in Bengal.

It is expected that they will considerably help educated young men to get a start in industrial life with a small initial capital and a fair return on the amount invested.

Scientific & Technical Topics.

Feathery Steel

Even engineers may be caught napping by the tremendous potentialities of a new high-tensile steel, whose perfection after two years' exhaustive experiments marks a new triumph for British research. It possesses twice the strength of other metals. It will not rust; and it is of a feathery, almost fantastic, lightness. One expert prophesies that within the next few years it will displace ordinary steel in all important constructional engineering works, just as the latter has in recent years ousted wrought iron.

Bridges, built with this super-quality metal, will sweep majestically over rivers 2,000 feet wide in single spans. If a vessel of 10,000 tons deadweight capacity, which has 2,000 tons of ordinary steel in its hull, were now reconstructed with the new metal, it would not only be lighter and more economical to run but able to increase its cargo capacity by 300 tons.

Radio Farming.

Wireless energy may soon become as essential to farmers as horse or petrol power. In America, machines for producing ultra-short electric waves of high-frequency power are now being commercially manufactured. They will be used to destroy weevils and other insect pests, resident in wheat, sterilized milk and meat, dry timber, purge diseased or insect-infested soil, and stimulate the growth of chickens. One fruit farmer, finding his orchard plagued by moths, irradiated the foliage for ten seconds, and not a moth remained alive.

Ultimately, the Soviet Union hopes so to revolutionize the growth of crops

that two harvests instead of one may be reaped each year. Cotton seeds, irradiated for five seconds, showed astonishing growing power. Buds appeared on the plants ten days earlier than usual; the capsules burst twenty-seven days in advance, and the whole crop was stronger, healthier, and more productive than any previously known.

Substitute for Radium

Described by the chairman as "the most startling communication of the conference," it was announced by Dr. J. D. Cockcroft, of the Cavendish Laboratory, Cambridge at the final session of the Industrial Physics Conference in Manchester that there had been artificially produced a new radio-active substance in sufficient quantities to equal in effect a gramme of radium.

The most interesting of several radio-active forms of the common elements that had been produced, said Dr. Cockcroft, was a radio-active form of sodium. It was made by bombarding ordinary sodium with heavy hydrogen, and it emitted gamma-rays of more than twice the energy of any from of the radio-active elements. This radio-active sodium gradually changed back to stable magnesium, losing its radio-activity in about twelve hours.

Dr. Cockcroft added: "It does appear possible that such radio-active sodium can be produced in large quantities so that the equivalent of one gramme of radium can be produced, if the figures that have so far been given are accurate."

Motoring on Air.

Not long ago an inventor in Britain caused a sensation by stating that he could extract a motor spirit from salt water. Now a Japanese engineer has made an even more astonishing claim. He is alleged to have stated that he can extract a motor fuel from air! It is an established fact that with an increase of temperature most solids turn liquid, and liquids resolve into gas. The temperatures at which such changes take place depend, of course, upon the substances. Air liquefies at very low temperatures, however, and in the invention it is cooled in special containers. When released, it acts in very much the same way as gas, and the expansion, it is claimed, is sufficient to move the piston of an engine.

Insect Pest Exterminating Machine.

Considerable interest was evidenced by various highly-placed officials of the Nizam's Government in the insect pest exterminating machine of the French inventor, M. Mensasche who with his engineer, M. Demoutier, paid a visit to Hyderabad at the invitation of the Nizam Government and installed one of his machines in the Musi river gardens.

Although mosquitoes and insects are scarce during the hot weather, the French inventor's device, which consists of an ultra-ray burner and a suction fan, worked wonderfully well, attracting and trapping a large number of mosquitoes and insects.

M. Mensasche claims that by the use of a battery of his "Entoray" machines malaria-carrying mosquitoes can be easily exterminated and the disease eradicated within a reasonable period. He further claims that his invention provides the most practical means of getting rid of insect pests that attack crops causing irreparable damage and heavy loss to agriculturists.

Mechanical Bradshaw

People who habitually miss trains through pouring over the packed pages of a Bradshaw, or tearing up and down platforms in search of a porter, will find the

robot time-table, recently installed at Victoria Station, London, a boon. By comparison it works at lightning speed. It asks you only to press a button on its keyboard, corresponding to the number of the station you wish to visit. This is obtained from a list on the back. Then, instantly, a printed card flits into the robot's window, detailing the full train services between Victoria and your destination.

For further clarity the timetable indexes are coloured. Week-day down trains are listed in yellow, week-day up trains in pink, Sunday down trains in green and Sunday up trains in orange. Within the next few months, the Southern Railway plans to equip all its principal stations with similar machines.

Lively Metal.

Quicksilver, or mercury, is derived from an ore that is a mixture of sulphur and mercury, called "cinnabar," and when very pure is a brilliant vermilion. It was from this source, indeed, that vermilion used to be obtained. Now-a-days, however, it is usually made by heating mercury together with sulphur, potash and water.

Mercury is called "quick" silver because it seems as if alive, so lively is the way in which it runs about. It is a fluid—that is to say, molten—at temperatures which render other metals solid.

Some tribes of California Indians have used cinnabar for red paint since prehistoric times, frescoing their faces and bodies with it.

To get the quicksilver from the ore it is necessary merely to separate it from the sulphur with which it is chemically combined, and this is accomplished by roasting. The ore goes from the crusher into a furnace, where high heat volatilizes the quicksilver, the latter being thereupon precipitated pure in a water-jacketed condenser. Out of the condenser it runs in a silvery stream and is put up in wrought-iron flasks for market. The metal has a strong affinity for gold, and is used in connection with gold mining.

Formulas, Processes & Answers.

Salt Clarifying.

781 N. C. A., Gujranwala—Desires to know the process of clarifying salt.

In order to clarify salt, dissolve a quantity of salt in water by boiling or take fresh brine and mix it with calves', cow's or sheep's blood (for every 20 gallons of brine 2 quarts of blood). Of this mixture put about 2 quarts into a pan that holds about 260 quarts of brine; this bloody brine at the first boiling of the pan brings up a scum which is skimmed off with a ladle. Continue boiling until the volume is reduced to half. At this stage add fresh brine and 2 quarts of the following; take a quart of white of eggs, heat them with as much brine as treated with blood. As soon as this is added, boil sharply till the second scum arises; then skim it off as before, and boil very gently. The manufacturers generally put into each pan of the size aforesaid, about a quarter of a pint of the best and strongest ale they can get; this makes a momentary ebullition, which is soon over, and then they abate their fires yet not so but they keep it boiling over though gently; for the workmen say that if they boil fast here, it washes their salt. Continue boiling gently till a kind of scum comes on it like a thin ice; which is the first appearance of salt; then that sinks and the brine allows to crystallise. The salt is next dissolved in water to produce a saturated solution. Now take a quarter of a white of an egg and put

it into a gallon or two of this brine. Beat it with hand so as to produce lathers like soap. Next a small quantity of this froth is put into each vat to produce scum on the surface. By this means the salt afterwards crystallises out and is quite white. The white of one egg may clarify 20 bushels of salt.

Preserving Fish.

796 P. M. S. A., Bridgetown, Barbados—Desires to know processes for preserving fishes.

It is a common practice of salting hilsa fish in some localities of market. Other fish is dried in the sun and sold everywhere. Fish may be preserved by the following methods.

Salting Fish Dry.

Take a good stoneware vessel or an earthen jar for the purpose. The fish should be cleaned and cut in pieces and only fresh fish should be used. The fish should be weighed first and one-tenth of the amount of well-rubbed salt sprinkled over it. A little turmeric and red pepper may be added to improve the flavour. The individual pieces should be packed in layers and salt sprinkled between each layer so as to completely cover them. Hilsa fish will keep in this very well. If available a little lemon juice and salt-petre may be added during the rubbing of salt as this acts as a preservative and improves the flavour of the product.

Preserving Fish in Brine.

Fish can be suitably preserved in a

strong brine solution, but this is only done in the case of hilsa. A saturated brine solution should be made with the addition of spices, sugar, lemon juice and saltpetre. The brine solution should be heated first and then poured hot on the fish.

Dry Fish.

Fish may be easily dried in the sun with or without salting. This practice has been in vogue amongst fishermen for a long time. It is often found that insects cause a great deal of damage to the dried fish but this can be avoided by sprinkling powdered red pepper over them whilst they are hung on lines for drying.

Before drying, fish should be cleaned and cut in halves without detaching them at the tail end. It is better to let them remain in strong brine before putting in the sun to dry.

Fruit Crystals.

1020 N. & S., Hingli—Wishes to have the processes of preparing fruit crystals, etc.

Fruit crystals are generally made without sugar. The basis is citric acid coarsely powdered. To this is added:— For (1) Ginger: Gingerin $\frac{1}{2}$ dr.; spirit colouring 1 dr.; for (2) Lemon: oil of lemon 1 dr.; croceine B2 gr.; alcohol 1 dr.; for (3) Raspberry; fachsine 2 gr.; essence of raspberry $\frac{1}{2}$ oz.; for (4) Orange; oil of sweet orange $\frac{1}{2}$ dr.; azo-orange 2 dr.; alcohol 1 dr. These quantities are sufficient for 10 oz. of citric acid. The colour and flavour should in each case be mixed together before adding to the citric acid,

which is then to be powdered. Many other flavours than the above can be produced. An ounce of the fruit crystals and 1 lb. of sugar form with a pint of boiling water the fruit syrup, which with a sufficient amount of cold water makes a refreshing summer drink. If tartaric acid is used instead of citric acid the resulting crystals may be done up in packets with a paraffin paper wrapping. Tartaric acid destroys yellow and orange dyes.

The following are other formulas for fruit crystals:—

LEMON.

Tartaric acid	3 lbs.
Granulated sugar	6 lbs.
Oil of lemon	2 oz.
Alcohol	2 oz.
Quinoline yellow to colour.	

ORANGE.

Tartaric acid	1 lb.
Oil of bitter orange	$\frac{1}{2}$ oz.
Granulated sugar	3 lbs.
Alcohol	1 oz.
Croceine orange to colour.	

RASPBERRY.

Tartaric acid	1 lbs.
Granulated sugar	3 lbs.
Concentrated essence of raspberry	2 oz.
Raspberry colouring a sufficiency.	

STRAWBERRY.

Same as raspberry, but with 2 oz. of concentrated essence of strawberry in place of raspberry essence.

Headache Cologne.

I.

Acetic ether	100 c. c.
Solution of ammonia	
(28 per-cent)	14 c. c.

Oil of peppermint 7 c. c.
Eau-de-Cologne to
make 1000 c. c.

II.

Menthol 40 grms.
Eau-de-cologne to
make 1000 c. c.

Cordials.

1446 P. I. H., Rawalpindi—Wants processes for preparing cordials.

Cordials are of two kinds, viz., alcoholic and non-alcoholic. The former are exciseable. The non-alcoholic cordials are made in great variety and are generally of a fruity character; during recent years they have acquired great popularity as beverages to be diluted for use in the household and for picnic purposes.

The following is a general formula for making fruit cordials:—

Cinnamon 5 dr.
Clove 2 dr. 24 gr.
Nutmeg 2 dr. 24 gr.
Alcohol (49 p.c.) a sufficiency.
Fruit syrup to produce 35 oz.

Reduce the solids to No. 40 powder and percolate with alcohol (49 p. c.) until 9 oz. of percolate is obtained. To this add the syrup Mix with 2 dr. of talc and filter.

Artificial Lemon Squash.

Sugar 2 lb.
Citric acid 1 oz.
Water 28 oz.

Dissolve and add the following, previously prepared:—

Oil of lemon $\frac{1}{2}$ dr.
Tincture of lemon peel 1 oz.

Tincture of turmeric $\frac{1}{2}$ dr.
Caramel 20 min.

Shake the tincture of lemon peel with the oil of lemon occasionally for 4 hours; allow the oil to separate, decant the tincture and mix the latter with the other ingredients, and filter.

Artificial Orange Cordial.

Sugar 2 lbs.
Water 26 oz.
Dissolve by heat and add
Orangeade essence 1 oz.
Citric acid $\frac{1}{2}$ oz.
Orange flower water 3 oz.
Caramel 1 dr.
Mix and filter.

Lime-Juice Cordial.

Glucose syrup 8 galls
Cane sugar 108 lbs.
Water 20 galls.
Lime juice 18 galls.
Oil of orange 4 dr.
Oil of nutmeg 1 dr.
Alcohol (90 p. c.) 10 oz.

Dissolve the sugar in the water by heat, add the lime juice and glucose syrup. Dissolve the oils in the alcohol, mix with the cordial and filter through a felt bag.

Another formula:—

Citric acid 2 oz.
Sugar 3 lbs.
Water 2 pints.

Dissolve by the aid of heat. When cold add

Lime juice 30 oz.
Tincture of lemon 2 oz.
Water to make 1 gall.
Caramel to colour q.s.

Lemon Squash Essence.

Soluble essence of lemon 10 oz.

Oil of bergamot 1 dr.

Shake together with a little kieselguhr and filter.

Enamelling on Gold.

814 V. B., Négapatam—Wishes to learn the process of enamelling on gold.

Before proceeding to enamelling articles of gold first of all prepare enamels of different colours required for your purposes. The base of all kinds of enamel is glass, coloured in different shades by the addition of metallic oxides and melted with it. A few recipes follow:—

WHITE.

Crystal glass, 30 parts, by weight; oxide of tin 6 parts; borax 6 parts; dioxide of arsenic 2 parts; powder (consisting of 15 oz. tin per 100 of lead), 100 parts by weight; carbonate of potassium 40 parts. Fuse the whole in a crucible with a small quantity of manganese. Pour it into water, and after having pulverised it, melt again 3 or 4 times.

BLUE.

Crystal glass, 30 parts by weight; borax 5 parts by weight; cobalt oxide 4 parts; calcined bone 4 parts; dioxide of arsenic 2 parts. Proceed as before.

RED.

Pounded flint glass 12 parts; red lead 16 parts; borax 3 parts; flints 4 parts. Fuse in a crucible for hours, then pour it out into water, and reduce it to powder in a mortar.

For applying the enamels, reduce them to fine powder in an agate mortar. During this operation, soak the enamel in water. For dissolving the impurities which may have been formed during the

operation, pour immediately a few drops of nitric acid and mix well and then wash to remove the excess.

In the meantime heat strongly the gold article to be enamelled in order to burn off the impurities and thoroughly cleanse in a solution of nitric acid diluted with boiling water. After rinsing with pure water and wiping with a very clean cloth, it is heated slightly and is then ready to receive the enamel.

Apply the enamels with a steel tool in the form of a spatula, the vehicle being water. When the layer of enamel has been applied remove the contained water by means of a fine linen rag pressing slightly on the parts that have received the enamel. Then place it before fire to remove every trace of moisture. Thus prepared put it on a fireclay slab and introduce in a muffle furnace to fix the enamel.

Artificial School Slates.

826 M. D. J., Amritsar—Wants to know a process of manufacturing artificial school slates.

The artificial slate coating on tin consists of a mixture of finely ground slate, lamp black, and a water-glass solution of equal parts of potash and soda water-glass (1.25 sp. gr.). The process is as follows:—

First prepare the water-glass solution by finely washing equal parts of solid potash and soda water-glass and pouring over this 6 to 8 times the quantity of soft river water, which is kept boiling for about $1\frac{1}{2}$ hours whereby the water-glass is completely dissolved. Take 8 parts finely crushed slate finely ground with little water into impalpable

dust, 1 part lamp black, which is ground with it and grind enough of this mass with the previously prepared water-glass solution as is necessary for a thick or thin coating. With this compound the roughened tin plates are painted as uniformly as possible and allowed to dry.

Castor Oil For Medicinal Purposes.

To extract castor oil for medicinal purposes, the seeds are crushed in a screw press with horizontal rollers and the resulting pulp pressed in gunnies. The cold-drawn oil thus obtained amounts to 36 per cent. and is used as laxative.

Colouring Electric Bulb.

Dissolve 25 parts of bleached shellac, 8 parts of powdered rosin, and 1 part of gum benzoin in 75-100 parts of methylated spirit, and add an alcohol-soluble aniline dye (light-fast) of the colour desired.

Menthol Toothache Drops.

Menthol	8 parts.
Chloroform	8 "
Alcohol	84 "

Mix the ingredients as intimately as possible. In case of toothache resulting from caries, a little cotton-wool is steeped in the preparation and inserted in the hollow of the tooth.

Cement for Joining Glass.

1078 M. S, Ellore—Desires to know a process of making cement for joining glass.

Soak 1 dram of isinglass in water and pour upon this enough alcohol to cover the mass, and allow the isinglass to dissolve, aiding the solution by placing the mixture in a warm place. Next dis-

solve $\frac{1}{2}$ dram of mastic in 1 fluid dram of rectified spirit of wine. Mix both solutions together, then put into the mixture $\frac{1}{2}$ dram of powdered gum ammoniac, and evaporate the mixture on a water bath until it has acquired the desired consistency. Put the cement by standing the phial in a cup of hot water. Before use, heat the edges of the articles where the joint is to be made.

Battery Solution.

1097 M. F.—Wants to know the process of preparing battery solution.

To prepare battery solution of specific gravity 1.2, take chemically pure sulphuric acid 5 gallons and dilute it with 16 gallons of distilled water. In diluting the acid great care is required, owing to the dangerous properties of the acid and the great heat developed by its combination with water. The acid should be poured slowly into the water in a lead lined tank and well stirred by a wooden rod.

Vinegar of Blackberry.

Take 15 srs of expressed juice of blackberry and strain. Put it into an earthen vessel and bring to boil. When it bubbles up, pour it into a wide-mouthed jar, cover mouth well and place in an open space in the sun and-dew. Then a film will appear which should be collected and thrown away. Strain and leave it as before. The operation should be repeated as many times as the layer forms and the liquid is strained every time. Finally strain and bottle.

Red Colour for Syrup.

Take 1 part of carmine in fine powder, 4 parts of strong ammonia

water. Rub up the carmine and ammonia and to the solution add distilled water, little by little, under constant trituration to make 24 parts. If on standing this shows a tendency to separate, a drop or two of ammonia will correct the trouble.

Removal of Tobacco Stains from Finger.

1274. R. G., Calcutta—Desires to know processes for removing tobacco stains from finger.

I.

Sodium sulphite 25 parts.

Water 100 parts.

Hydrochloric acid 2 parts.

Mix. To remove tobacco (nicotine) stains paint the spot with this solution and allow it to dry before washing off.

II.

Hydrogen Peroxide 10 parts.

Ammonium chloride 1 part.

Alcohol 5 parts.

Mix and apply in the manner stated above.

Green Colouring Matter for Hair Oil.

1097 M. N.,—Wants a recipe for imparting green colour to hair oil and the process of painting glass, rendering glass opaque, etc.

To impart green colour to hair oils use chlorophyll, which is extracted from the leaves and stalks of plants. It is soluble in alcohol and ether, but insoluble in water.

You may also use green parsley for this purpose. This substance when steeped in oil, for a few days, would impart to it a green colour.

Painting on Glass.

Melt clear rosin 1 oz., in an iron vessel, let cool a little when add sufficient

oil of turpentine to keep it liquid. When cold, grind colours in oil and mix.

Rendering Glass Opaque.

Paint the glass with the following solution.

Zinc sulphate 3 parts.

Magnesium sulphate 3 parts.

Dextrine 2 parts.

Water 20 parts.

Mix. Use this paint on glass, which will become translucent on drying.

Mirror Making with Mercury.

This process consists in applying a thin amalgam of tin and mercury to the surface of glass which is done on a perfectly smooth and horizontal marble table with a gutter running round the edge. On the surface of this table, a sheet of tinfoil somewhat larger than the size of the plate of glass to be operated is evenly spread and every wrinkle on its surface is carefully removed by means of stroking and beating with a covered wooden rubber. A small quantity of mercury is then poured on and quickly rubbed over the entire foil with a clean piece of soft woollen stuff and at the same time the scum of dust, impure tin and mercury are taken off. Now mercury is poured upon the quickened foil until its depth becomes sufficiently thick to float the glass to be silvered. The edge of one of the sides having been cleared of the scum, the glass plate is slid along over the surface of the liquid metal from that side. Previous to this operation the glass to be silvered is thoroughly cleaned with wet whiting, then washed with distilled water and completely dried. When the glass has arrived at this proper position, gentle pressure is applied and the

table is tilted diagonally as to allow the superfluous mercury to run into the gutter, after which it is covered with a piece of flannel and loaded with many weights. The glass is left for 24 hours under this condition and after this it is turned over and removed to a wooden table and further slanted, and this position is gradually increased until it becomes perpendicular. In case of large sheets time taken is not less than a month.

Portland Cement Composition.

1100 M & C., Arni—Wants to know the composition of portland cement

Take chalk, or any other rich lime-stones 65 to 80 per cent., clay and iron oxide 20 to 35 per cent. Mix thoroughly with water in a mixing machine. Dry slowly on hot plates. Reduce to fine powder in a kiln. Keep in a dry place for some months before it is used, as by this means the quality of the cement is greatly improved. When agitated with water, it quickly sets and has considerable cohesion which lessens with admixture of sand.

Handkerchief Perfumes.

1657 M. C., Nagpur—Wishes to have formulas for preparing handkerchief perfumes.

In preparing non-alcoholic perfumes terpineol and benzyl benzoate are generally employed as solvents for essential oils. A few reliable recipes follow:—

LILY OF THE VALLEY.

Synthetic lily otto	50 parts
Terpineol	40 parts.
Linalol	10 parts.
Synthetic musk crystals	2 parts.

Mix and put in stoppered bottle. Shake frequently until dissolve.

NARCISSUS.

Synthetic narcissus otto	50 parts.
" rose otto	2½ parts.
" musk crystals	1½ parts.

Treat as above.

VOL. XXVI. No. 305.

VIOLET.

Benzyl benzoate	50 parts.
Heiko-velchen (violet)	13½ parts.
Iraldein	12½ parts.
Heiko-mugenot	2½ parts.
Synthetic musk solution	2½ parts.
" cassie otto	1 part.
Treat as above.	

Perfumed Betelnuts.

To prepare perfumed betelnuts, pulverise the betelnuts and then mix with a small quantity of glycerine. Next put some harmless pink colour like ammoniated carmine solution and finally perfume with menthol, eucalyptus oil, camphor, etc., the proportions of which may be ascertained by a couple of trials.

Nickel Plating.

1057 B. B. P., Kunnankulam—Desires to have process of removing nickel plated articles.

To brighten old nickel plated articles it is the best plan to wash them with dilute hydrochloric or nitric acid. When this is done, dry the articles and then rub with soft woollen stuff to brighten the surfaces. If this does not produce any appreciable result, then there is no other alternative than to plate them again. A good recipe is given below:

Dissolve 10 parts of sulphate of nickel and ammonium; 2 of sulphate of ammonium; in 250 parts of boiling water. Let cool.

To coat, the objects should be stripped by a mixture of 16 lbs. of sulphuric acid, 4 lbs. of nitric acid; and 4 pints of water. The articles to be stripped should be tied with a string copper or brass wire and placed for a few minutes in the bath. As soon as the article presents a smooth surface, it should be placed in cold water.

The articles are then dipped in the solution already prepared connecting them to the negative pole of the battery. The positive is dipped in the solution. When the desired result is obtained take out the articles and dry.

READER'S BUSINESS PROBLEMS

[Reader's business problems will be discussed in these pages. We invite the reader to write us his difficulties. As the department is in charge of an experienced businessman who is specially adept in dealing with such problems and to whom experiences of a large number of successful business men are available, his replies will lead the enquirer to a successful career. These replies will be published in the paper only and cannot be communicated by post.]

Salesman of a Shop.

1315 M. C. A., Bombay—Enquires what are the qualities that make a good salesman in a retail shop.

The salesman should have a thorough knowledge of all the goods, he must know the stock, what it is and where to find it. A thorough knowledge of the goods enables one to talk over such selling-point as style, durability, the purpose for which the article is best suited, its convenience to the customer, the comfort which it gives, its purity, safety, beauty, construction, cost of producing it, how it compares with similar articles made by competitors. But any explanation must not be over the head of the buyer. Technical matters should be brought out in a simple and interesting way or they will not be understood.

Concentrate in your customer see that there is nothing to distract like noises, smells, smoke or dust. Make the customer comfortable and feel at ease taking him from the gaze of the public if this is advisable. Aim to please rather than to sell. By aiming to please the selling will take care of itself. Be thorough patient, interesting in your descriptions; keep your mind on your work. Appeal from every angle politely, graciously and sincerely by means of suggestion, by exercising the buyer's imagination, by appealing to the instincts, emotions, desire, interests and habits.

Advertising Agent.

1211 L. M. A. D., Bombay—Wants to know the prospect of an advertising agent and how to write a good advertising copy.

The advertising agents are the creations of the modern times. Their functions are generally limited to the collection and acceptance of advertisements for daily papers and other media of advertisement and receive a part of the total collection as their remuneration. The papers sometimes collect a part of their advertisements themselves but occasionally divest themselves of all responsibilities about advertisements and decline to take advertisements from any new comer, referring any applicant to an agent, who would deal with each in turn, collect the money and then transfer the advertisements wholesale to the paper. An enterprising young man can easily set himself up as an advertising agent and eke out an honourable living.

A little reflection will show that one design or one piece of copy may sell far more goods than another occupying the same space. And when to this is added the difficult task of selecting the right magazines and newspapers and negotiating space in them at the lowest possible rate, the supreme importance of the professional advertiser is at once apparent. The advertising agent should advise manufacturer or merchant whether

certain advertisement will pay him, or not.

What is Good Advertising Copy.

All advertising copy can be best judged by the tripple test viz., by its power to attract attention, to interest and to convince. It is one thing to attract attention, to amuse, to entertain, to satisfy the artistic sense and quite another thing to convince the reader and to cultivate in him a new want. It is easy for the artist and the writer to interest the reader. They may even do this to the great delectation of the reader without any real knowledge of the product advertised. Unless the copy carries conviction, however, the space occupied and the money of advertiser are largely wasted. There are many commodities however, that cannot be sold simply by printing a beautiful picture of a woman or of a fat boy. The consumption of a product rests upon intelligent selection, and this intelligent selection must come from a knowledge of the product and the claims that are made for it.

Food advertising must have 'Smack' in it. On reading the advertisement water should come in the mouth and gastric juices should flow. Good copy should therefore, attract the attention of the reader; it should interest him enough to hold his attention; and it should present arguments that are convincing.

Improvement of Steel Trunk Business.

1432 R. D. A., Bombay—I have a steel trunk business in Bombay and I am suffering from the present trade depression. What am I to do to improve my affairs?

This would largely depend upon the amount of fund at your disposal, as there are two ways of improving the prospects of a dwindling business. One is spending more money on it, and the other by deducting your overhead charges. If you

feel that you are in a position, without jeopardising your solvency, to sift your business to a better situation which would require you to pay higher rates of rent and to spend greater sums of money in advertisements, you may try that experiment. But, before doing that you must satisfy yourself to the best of your ability that you will be able to increase your profits by this increased expenditure, if you apply yourself to the business with renewed zeal and vigour. Your own personal experience in this respect should enable you to answer this question. Advertisements judiciously given, and the distribution of handbills, all written in telling style, almost always help the business man in recovering lost ground. You may also engage some brokers on payment of just a little more than their usual rates of commission, to secure customers for you.

If on the other hand, your pecuniary circumstances do not warrant you to increase your expenses, or if you think that to be too risky a step; then we are afraid, the only course left opened for you is to reduce your establishment charges by curtailing the number of your assistants, should you have any and by yourself personally attending to all the needs and requirements of your customers. You may none the less engage brokers on increased commission and keep on distributing hand bills, which will not cost you much. If you can secure the services of some canvassers who will agree to work for you on a commission basis so much the better. You might certainly devote greater care and attention to exhibiting your goods effectively by attractive window display, and for this purpose might study the methods adopted by your more skilful rivals in the market. You need attract more customers and all your endeavour should be turned to that.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of Industry are invited. Enquiries or replies from our experts will be published free of charge. Questions are replied by post on receipt of As. 4 stamps of small value only for each question. In order to facilitate the work of Editor's Department and to help prompt action the readers are requested to send enquiries in separate letters.]

1286 S. L. P. N. M., Amritsar—We have no book dealing with gilding. Gold and silver threads are not manufactured by the process of gilding. A rod of copper is wrapped with gold by hammering. Then it is drawn into wire.

1288 S. I. F., Amritsar—Process of manufacturing citric acid from lemon juice will be found in July 1933 issue of Industry.

1289 B. G. N., Nagpur—(1) Tin cans may be supplied by Marni Sakujira Shoten, 10, Andojibashidori, 2-Chome, Minamiku, Osaka Japan and Nakane Kojo, 301, Noe-cho 2-Chome Higashinari-ku, Osaka, Japan. (2) Textile soap is used for washing wool and silk while washing soap is used for washing cotton which may not be neutral soap. (3) Other formulas you require will appear in an early issue of Industry.

1290 S. R. M., Haveri—For rice husking machine write to Machinery Supplying Agency, 40, Strand Road, Calcutta.

1291 C. S. N., Mambalam—For tin cans required write to Metal Box of India Ltd., B2, Hide Road, Kidderpore, Calcutta.

1295 N. N. S., Jamnagar—Process of manufacturing peppermint, essence, and essence of padma will appear in an early issue of Industry.

1299 G. C. B., Malda—You perhaps mean flying clubs. Following is a list of flying clubs: Aero Club of India & Burma Ltd., Delhi; Bengal Flying Club Ltd., Dum Dum; Delhi Flying Club Ltd., Delhi, and Kathiawar Flying Club Ltd., Kathiawar.

1300 M. S., Karachi—It is very difficult on our part to suggest the names of foreign firms who will buy Indian produce from you. You may however write to Indian Trade Commissioner, India House, Aldwych, London W.C.

1301 T. K. J., Sukkur—Process of making mercerised yarn will appear in an early issue of Industry.

1302 B. R., Phellaur—In the formula of cheap washing soap which appeared in May 1935 castor oil should be 15 seers and caustic soda 18 seers.

1305 A. D., Barpeta—(1) As far as we know Calicut Soap Training Institute has been closed. There is arrangement for training students in Soap manufacture under the auspices of Director of Industries, 40/1A, Free School St., Calcutta. (2) In order to remove the defect in soap manufacture you should read some books on the subject or engage some expert who will rectify your defect. You may also take up correspondence course of soap training from R. Ghose, Soap Expert; 8, Kripianath Lane, Calcutta, who has long factory experience, and so far as we know his training is most satisfactory. (3) Soap stamping machine may be had of Small Machinery Manufacturing Co., 22, R. G. Kar Road, Calcutta. (4) You should use coconut oil in manufacturing toilet soap by cold process. But in milled toilet soap 10 to 20 p.c. coconut oil is generally used, and the rest is tallow.

1307 S. M. S., Bombay—(1) Strawboard making machines may be supplied by West End Engine Works Co., Edinburgh; M. Hanser, 48, Landaner Strasse, Nenstadt, Germany, and Farrel Foundry and Machine Co., Ansonia, Connecticut, U. S. A. (2) For electric bulb making machine you may enquire of Murray Iron Works Co., Burlington Iowa, U. S. A. and Fairbanks, Mose & Co., Chicago, Illinois, U. S. A. (3) For safety razor blade making machine write to New Britain Machine Co., New Britain,

Machinery for the Manufacture of

Chemicals, Powder, Hair Oils, Creams, Perfumes, Pills, Tablets, Drugs, Medicines, Artificial Ghee, etc. Also:—

Chemical Plant, Oil Mills, Filter Presses, Sugar Mills & Centrifugals, Tin Box Making Machinery, Sterilisers, Laboratory Apparatus, Biscuit and Bread Making Machinery, Laundry Machinery, Tube-filling Machinery, Winnowing Machinery, Threshing Machinery, Fruit Pumps for all purposes.

W. J. ALCOCK & CO., 7, Hastings Street, Calcutta. Saroup & Bansilal, 57, The Mall, Lahore. Agent for Bareilly District KODESIA ENGINEERING CO., Naini Tal Road, Bareilly.

Connecticut, U. S. A. and Baird Machine Co., Bridgeport, Connecticut, U. S. A.

1308 A. S. S., Ernakulam—Enamelled sign-board may be had of Calcutta Enamel Works 108, Prince Anwarshah Road, Calcutta; Sur Enamel & Stamping Works, 9, Middle Road, Entally, Calcutta; and Pioneer Enamelling Works, Grand Trunk Road, Amritsar.

1310 A. N. K., Quetta—You may use metal token instead of paper coupon

1314 K. S., Vizagapatam—(1) Handloom may be had of Bros Partner & Co., 7, Ezra Street, Calcutta, and Hand Loom Weaving Supply Co., Serampore, Hooghly. (2) For dyeing yarn you may consult Cotton Dyeing & Printing published from this office. (3) For well boring implements write to Swedish Trading & Engineering Co., 13-3, Old Court House Street Calcutta.

1317 H. R., Hyderabad—Process of making castor oil laxative chocolate will appear in an early issue of Industry.

1319 I. D., Gujrat—Process of bleaching and deodorising oil by chemical process will be found in Vegetable Oil Industry which you have already got. Process of deodorising coconut oil will be found in March 1935 issue of Industry. This process is applicable to all kinds of vegetable oil.

1320 H. P. T., Ghazipur—Process of stain removing appears elsewhere in this issue of Industry.

1321 M. P. S., Bhadoni—For design book required write to Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta, and Thacker Spink & Co. (India) Ltd., 3, Esplanade East, Calcutta.

1322 M. T. A. C., Ahmedabad—An exhaustive article on fruit preservation appeared in the last issue. In this article you will find the process of mango jam making.

1323 A. G., Honavar—Process of distillation will appear in an early issue of Industry.

1332 J. B., Jagadhri—An article on mantle manufacture will be found in June 1933 issue of Industry. You may start the industry with Rs 10,000. Following is a list of mantle manufacturers: B. K. Shaw, 3, Beadon Street, Calcutta; Bengal Scientific & Technical Works, P513, Rash Behari Avenue, Calcutta; Light

House Mantle Manufacturing Co., 47/C, Kotachi Wadi, Girgaon Road, Bombay, and M. T. Saha & Co., Gupta Mansions, 84A, Clive Street, Calcutta.

1334 B. N. S., Lahore—No such institute is known.

1338 M. R., Nellore—For the books required write to Thacker Spink & Co. (India) Ltd., 3, Esplanade East, Calcutta.

1340 L. K., Aijal—Process of regalanising tins and bluing gunbarrels will appear in an early issue of Industry.

1344 N. S., Hingoli—(1) Lantern slides may be had of Calcutta Pure Drug Co., 4/1A, Waterloo Street, Calcutta. (2) Tablet making machines may be had of Dr Bose's Laboratories Ltd., 45, Amherst Street, Calcutta. (3) Can supply hen eggs. (4) Wants to be put in touch with dealers in silver polish pills. (5) Formulas you require will appear in an early issue of Industry.

1345 S. D. A., Bijapur—Process of glazing earthenwares will appear in an early issue of Industry.

1348 S. H. S., Jharsuguda—(1) For soda water machine write to Little & Co., 3, Grants Lane, Calcutta. (2) It is not possible to make ice cream without ice. (3) In preparing essence alcohol is a necessary article, you cannot do without it.

1349 I. B. W., Cannanore—Process of gilding book edges will be found in March 1935 issue of Industry.

1352 M. S., Lyallpur—Process of manufacturing aerated water, essence, and colour will appear in an early issue of Industry.

1354 A. S. W., Amalner—(1) Sweating of soap is caused by the excess of salt and free caustic in soap. To remedy this defect add washing soda upto 5 p.c. (2) Drying is due to the presence of too much water in the soap. To remove this defect you may use sodium silicate upto 25 p.c. (3) You may produce cheap soap by incorporating filling materials. A formula of cheap soap will be found in December 1934 issue of Industry. You may however consult Mr. R. Ghose, Soap Expert of 8, Kripianath Lane, Calcutta in this connection. (4) Washing soda and soda ash is one and the same thing.

— ESTABLISHED 1917 —

GANN BROTHERS, TOPALL WORKS, LUCKNOW.

THE ONLY SUPPLIERS IN INDIA OF

COMPOSITION CORKS FOR FOUNTAIN PEN INK POTS, BOOT CREAM BOTTLES, MEDICINAL AND FOR HAIR OIL PHIALS COMPOSITION POTS FOR OINTMENTS, POWDERS, POMADES, ROUGE, SINDUR, SNUFF, ETC.

Branches: 153/1, RADHABAZAR STREET, CALCUTTA 3, CHUNAM LANE, BOMBAY, 7.



(5) For selling soap you may appoint agents on commission basis.

1358 D. R. B., Chaibassa—(1) Used gramophone needles have no use. (2) Old gramophone records cannot be renewed. (2) Wants to be put in touch with purchasers of used gramophone needles, and old gramophone records.

1360 F. N. B., Bombay—Following is a formula of gold ink: Take honey and gold leaf equal parts; triturate until the gold is reduced to the finest possible state of division, agitate with 30 parts of hot water, and allow it to settle. Decant the water and repeat the washing several times; finally dry the gold, and mix it with a little weak gum water, for use. You may consult Ink Manufacture by S. Lenner, and Inks: Their Composition and Manufacture by C. A. Mitchell and T. C. Hepworth; both the books may be had of W. & G. Foyle Ltd., 119-125, Charing Cross Road, London W. C. 2.

1362 A. A. K. K. M., Tenkasi—Lead pencils may be supplied by Asai Shoten, 28, Itachibori, Minamidori, 2-Chome, Nishi-ku, Osaka; Fukui & Co. Ltd., 12, Hiranomachi 2-Chome, Higashi-ku, Osaka, and S. O. Fureiko & Co., 71, Minami Kynhojimachi 2-Chome, Higashi-ku, Osaka; all of Japan.

1363 S. R., Valparai—(1) An article on cardamom cultivation will be found in June 1935 issue of Industry. (2) You may also plant pepper with cardamom. (3) Ginger can be planted in forest upto an elevation of 4000 to 5,000 feet in the Himalayas. The soil must be rich but neither too heavy nor too light and the amount of moisture must be carefully regulated. (4) You perhaps mean deodorising coconut oil, process of which will be found in March 1935 issue of Industry.

1364 K. C. I., Bhimber—For selling Bentonite you may advertise mentioning in brief some of its properties.

1365 A. D., Barpeta—Formula of scented coconut oil will appear in an early issue of Industry.

1369 R. S., Palamau—Match making machines may be had of H. R. Brothers & Co., 81 A/C, Bechu Chatterjee Street, Calcutta. The firm will also supply you with an estimate for starting a factory.

1372 P. N., Karnal—Following is a list of tailoring institutes: Rao's Tailoring College, Sayce Bhuvan, Princess Street, Bombay; Deshaibandhu Tailoring Academy, 15, College Square, Calcutta, and Calcutta Commercial Institute, College Street Market, Calcutta.

1373 D. C., Calcutta—(1) Process of removing tattoo marks will be found in December 1934 issue of Industry. (2) For books write to Rand, McNally & Co., Chicago, Illinois, U. S. A., and R. R. Donnelley & Sons Co., Chicago, Illinois, U. S. A. (3) Hindi equivalent of vermilion is sindur. (4) We are not aware of any such directory. (5) Clocks and watches may be supplied by Uyemura Watch Co. Ltd., Bakuro-machi 2-Chome, Higashi-ku, Osaka, Japan, and K. Hattori & Co. Ltd., Dwajimachi 1-Chome, Higashi-ku, Osaka, Japan.

1379 K. B., Sialkot—(1) Following is a formula of rubber solution: Absolute alcohol 6 parts; carbon disulphide 100 parts; caoutchouc q.s. Mix the alcohol and carbon disulphide then add sufficient quantity of caoutchouc to form solution of desired consistency. The quantity of the solvents required depends on the consistency of solution required; if moderate heat is used and the mixture is shaken, the whole dissolves but a better solution is obtained for adhesive properties by using a large quantity of solvent not shaking, but drawing off the clear clayey liquid. It is not advantageous for you to manufacture lead tubes. Lead tubes may be had of Shah & Co., 55, Ezra Street, Calcutta. (2) For industrial books write to W. & G. Foyle Ltd., 119-125, Charing Cross Road, London W. C. 2. (3) Cigarette making machines may be had of T. V. Lynn & Co., 58, Forbes Street, Bombay.

1383 H. B., Khushab—(1) A white grease can be prepared by heating 100 parts of fixed oil and tallow with 15 parts of soda crystals (washing soda) and 180 parts of water; soft soap is one of the best materials for emulsifying oil and fats; for 100 parts of oil and fat add 2 parts of soft soap dissolved in a little hot water. To stiffen and cheapen the grease, French chalk may be added. (2) An article on cement manufacture will be found in June 1935 issue of Industry.

1386 S. K., Pilibhit—(1) Following is a list of agricultural magazine: Poona Agricultural College Magazine, Poona; Agriculture and Live Stock in India, 3, Govt. Place West, Calcutta. You may also refer your query to The Secretary, Agricultural & Horticultural Society,

GOLDEN OPPORTUNITY.

To all cotton merchants, exporters, consumers, in India and abroad, to entrust any kind of work such as Surveys, Arbitration dispute, Claims, Sales and Purchases in Bombay Markets, and Africa, Egypt, American centres, Foreign Exports and Imports, transit and despatch, reliable market opinion and telegraphic information Write to K. B. KOTAK, Lalit Block, Ville Parle, (India)—35 years expert in the line a Surveyor and Arbitrator of the East India Cotton Assn., and adviser in all kinds of business such as Gold, Silver, Seeds, Wheat and Sundries.

1, Alipore Road, Calcutta. (2) As regards journals of foreign countries you may try the following journals: American Agriculturist, New York, U. S. A.; Journal of Agriculture, St. Louis, Mo, U. S. A.; Wisconsin Agriculturist, Racine, Wisconsin, U. S. A.; Agricultural Gazette published by Iliffe & Sons Ltd, Dorset House, Tudor Street, London E. C. 4 and American Agriculturist published by A. F. Bird 22, Bedford Street, Strand, London W. C. 2. (3) For books on mango growing write to Thacker Spink & Co., (India) Ltd, 3, Esplanade East, Calcutta.

1388 M. P., Kamayut—Following is a list of weaving institutes Government Central Weaving Institute, Amritsar; Government Central Weaving Institute, Benares; Government Weaving Institute, Serampore, Hooghly, and Ranchhodlal Chhotalal Technical Institute, Ahmedabad. Prospectus of the above institutes will be found in Industry Year Book & Directory published from this Office.

1389 D. B. R. O. M., Purnea—We are not aware of any machine used for making chura (flattened rice). You may use German make match making machines.

1393 W. H. D., Galle—(1) Colour for crayon may be had of Akhoy Kumar Laha, 1, Dharamtala Street, Calcutta, and Abinash Chandra Dutt, 23/2, Dharamtala Street, Calcutta (2) Process of manufacturing chalk crayons will be found in July 1934 issue of Industry.

1394 N. G. M., Kathiawar—Process of preserving food products will appear in an early issue of Industry.

1395 J. N. V., Monghyr—(1) Process of mirror making will be found in December 1933 issue, and elsewhere in this issue of Industry. (2) Ingredients required for mirror making may be had of B. K. Paul & Co Ltd., 1 & 3, Bonfields Lane, Calcutta (3) There is no arrangement for receiving practical training on mirror making. (4) Brass fittings may be had of Gopal Chandra Dass & Co Ltd., 86A, Clive Street; Bombay Hardware Mart, 82,

Clive Street, and H. C. Roy & Co, 13 Clive Street; all of Calcutta. (5) Hindi equivalent of sodium silicate is not available.

1396 V. S., Chirala—The ink manufactured by you is good. This may be used as ordinary writing ink but not as fountain pen ink. We find the ink settling deposit at the bottom of the ink pot. Moreover it does not dry very soon. A good fountain pen ink should flow regularly, will not corrode nibs and should not settle deposit at the bottom of the ink pot.

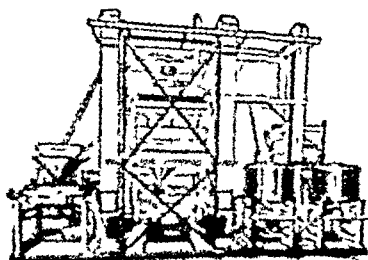
1397 M. O. S. C., Rangoon—(1) Lace may be had of Manif & Co, Hogg's Municipal Market, Calcutta; Rezwan Ali Mullick, D 6 & 7 Municipal Market, Calcutta; Chimanlal & Co., Edross Buildings, New Charni Road, Bombay; R. K. Moti Shaw & Co., Hummum Street, Bombay and Kishen Chand & Sons, Chandni Chowk, Delhi. As regards foreign addresses you may write to Black Bros Ltd, Stoney Street, Nottingham; British Lace Ltd, High Church Street, Nottingham and Matter Bros., Kolliken, Switzerland (2) For buttons write to Regal Button Works Ltd, Dorchester Street, Birmingham; Irish Button Manufacturing Co. Ltd, 36, Bedford Street, Belfast, Ireland and Emmericher Kunsthorfnabrik, G.m.b.H. Emmerich A Rh, Germany.

1402 P. D., Gwalior—Process of electroplating will be found in Independent Careers for the Young published from this office.

1403 S. R. Roorkee Cantt—(1) Aniline black may be had of Fuzlehussein & Bros., 44, Armenian Street, Calcutta (2) Oleic acid may be had of Butto Kristo Paul & Co. Ltd., 1 & 3 Bonfields Lane, Calcutta, (3) Hindi equivalent of castor is "Gondhadustan."

1406 M. L. A., Trichur—You may write direct to Indo-Japanese Commercial Museum, 135, Canning Street, Calcutta for the directory and the journal you require.

1407 M. M. K., Maunpudaw—An exhaustive article on milk and milk products appeared in July 1934 issue of Industry. If you go through



Rice Mill Machinery

SELF-CONTAINED RICE MILLS TYPE F. H. S. ARE REPUTED FOR QUALITY, EFFICIENCY AND LOWEST WORKING EXPENSES.

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Single Mill sets, Spare Parts & Accessories Direct from Stock

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12, Clive Street - - - Calcutta.

the article you will find all the formulas you require.

1408 H. S. H. Bahrein—(1) For learning glass manufacture you may write to the Principal, College of Industry and Trade, 144, Dharamtala Street, Calcutta. He will supply you with all information. (2) For realising money you may negotiate with P. K. Ghosh, 12/1A, Nayan Chand Dutt Street, Calcutta.

1412 V. P. L. N., Madras—You may consult The Art of Enamelling on Metal by W. N. Brown and Enamelling on Metal by L. E. Millenet. Both the books may be had of W. & G. Foyle Ltd., 119-125, Charing Cross Road, London W. C. 2.

1413 T. L. R. Kovvur—(1) For turning grey hair black you may also use hair dyeing oil. Rottenone is an insect poison derived from derris root. It is not available in India.

1414 M. S. S., Ambajipeta—Ingredients for ink manufacture may be had of Fuzlehussein & Bros., 44, Armenian Street and B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane; both of Calcutta.

1417 A. S. A., Jharsuguda—(1) We cannot say the constituents of any particular developer. For such information you may analyse the product chemically. (2) Hindi equivalent of the ingredients are not available. (3) Chlorophyll can be employed for producing green colour of oil. (4) First make a concentrated infusion of coffee, dry in the sun and make into tablets with the help of a tablet making machine. (5) It is not advisable to start perfumery industry with Rs 100 only. (6) Amount of earning depends not upon machine but upon working hour. In my opinion knitting and hosiery machine will give maximum earning. (7) Production cost of soap depends upon the value of ingredients required. If you can secure raw ma-

terials at cheap price you can manufacture soap at cheap cost. You may use biri tobacco preparation. (10) Aerated water making machine may be had of Little & Co., 3, Grants Lane, Calcutta. (11) You may try freezing mixture; following is a recipe of freezing mixture: Potassium nitrate 4 lbs; ammonium chloride 4 lbs; water 1½ gallon.

1419 P. P. S. R., Pondicherry—Pipeclay may be had of Calcutta Mineral Supply Co. Ltd., 31, Jackson Lane, Calcutta. They also sell in retail.

1420 V. S. B. S., Murasarnagar—(1) For homeprinter write to W. H. Seller, 14, Hare Street, Calcutta. (2) Process of making duplicator will be found in January 1933 issue of Industry. (3) Fancy labels may be had of Shah & Co., 55, Ezra Street, Calcutta. Tin cans may be had of Metal Box Co. of India Ltd., B2, Hide Road, Kidderpore, Calcutta. (4) For calendar printing write to New Popular Press, 57, Simla Street, Calcutta.

1423 P. S. L., Periyapatna—Sodium metaphosphate is mixed with butter for preserving it. It has no injurious effect on health.

1426 T. C. H. K., Rohri—Your son may do some business bearing on electrical engineering. He may take up contract business such as electric installation, wiring, etc. He may also start a shop dealing in electrical goods.

1428 B. N., Gujrat—(1) You may start the restaurant in Delhi, Lahore, Lucknow, Allahabad and Cawnpore. You may start an aerated water factory with Rs 1000. (2) Aerated water making machines and other requisites may be had of Little & Co., 2, Grants Lane, Calcutta. (3) You may also start a shop stocking all sorts of bread and biscuits and lozenges, tea coffee, etc. (3) You may start a bakery with Rs 5000. If you have no experience in the line you may appoint an expert. (4) You may consult Manufacture of Syrup published from this Office.

1429 D. R. C., Lahore—(1) Following is a list of homeopathic institutions: The Dunham College of Homeopathy, 135/3, Bow Bazar Street, Calcutta; Bengal Allen Homeopathic College, 169A, Bowbazar St., Calcutta; The Calcutta College of Homeopathy, 266, Upper Circular Road, Calcutta; The Hahnemann Medical College and Hahnemann Hospital of Chicago, 2811-2813-2815, Cottage Grove Avenue, Chicago, U. S. A.; The New York Homeopathic Medical College and Flower Hospital, 63rd. & 64th. Street, Manhattan, New York, U. S. A. and The Hahnemann Medical College, 222-226, North Broad Street, Philadelphia, U. S. A. (2) You may send your photos to Times of India Illustrated Weekly, Bombay; and

S. H. Kelkar & Co.



36, Mangaldas Road,
Bombay No. 2.
Wholesale Importers and
Stockists of

Essential Oils, Aromatic
Chemicals, Synthetic Per-
fumes, Flower Ottos, Soap
Perfumes, Oil colours and
all sorts of Perfumery Raw
Materials required for Per-
fume Soap Makers, Agar-
bathi Manufacturers, etc.,
etc.

Prices and other Particulars
on Application.

Pictorial Magazine, Fleetway House, Farringdon Street, London E. C. 4.

1431 R. S., Ghaziabad—Formula you require will appear in an early issue of Industry.

1433 R. N. K., Kot Sultan—You may use rope making machines which may be had of Indo-Japanese Commercial Museum, 135, Canning Street, Calcutta.

1435 T. S. M. C., Ahmedabad—Refer your query to Industries Department, Bihar Govt., Patna.

1439 M. W. A., Darbhanga—Aniline black and violet may be had of Haverro Trading Co, 15, Chive Street, Calcutta.

1440 D. S., Gohana—(1) In the formula quoted by you increase the proportion of caustic soda to 1 sr. 6 ch. and water to 3 srs. 12 ch. (2) You may try the following formula of soap. Coconut oil 50 srs; mohua oil 10 srs.; castor oil 10 srs; groundnut oil 30 srs; caustic soda lye 39° Be 50 srs; silicate of soda 15 srs. water 10 srs. Make soap by half boiling process.

1441 L. B., Adampur—Formulas you require may be found in Pharmaceutical Preparations published from this office

1442 C. B., Bangalore—Process of manufacturing sulphate of ammonia and nitrate of soda will appear in an early issue of Industry.

1443 J. N. R., Palakol—You may refer your query to The International Correspondence Schools Ltd, International Bldgs, Kingsway, London W. C. 2

1444 P. N., Pilibhit—(1) For Japanese goods write to Mitsubussan Kaisha & Co. Ltd, 100, Chive Street, Calcutta.

1445 K. S., S. R., Ambajipet—(1) Eighty tolas make one seer; forty seers make one maund. (2) Refer your query to the Indian Trade Commissioner, India House, Aldwych, London W. C. 2 (3) Paper of all sorts may be had of C. M. Sur & Co, 105, Radha Bazar Street, Calcutta. (4) Ingredients for ink powder may be had of Fuzlehussein & Bros, 44, Armenian Street, Calcutta and B. K. Paul & Co Ltd, 1 & 3, Bonfields Lane, Calcutta. (5)

It is not possible to detect the presence of groundnut oil in coconut oil.

1447 R. L. J., Wahi—You may write to Calcutta Medical College, College Street, Calcutta; Carmichael Medical College, 1, Belgachia Road, Calcutta.

1448 B. A. R., Nairobi—Twine may be had of Swadeshi Silpa Mandir, Rani Dighirpar, Comilla and Bharat Trading Co, 22, Sukea Lane, Calcutta. For fishing nets write to S. Roy & Co, 9, Esplanade East, Calcutta.

1452 G. L. R., Waltair—For tin printing write to Marni Sokujiro Shoten, 10, Andoji-bashidori, 4-Chome, Minamiku, Osaka, Japan and Nakankoku, 201, Noe-cho, 2-Chome, Higashinari-ku, Osaka, Japan.

1454 P. C. U., Ahmedabad—You may stock building materials such as hinges of all sorts, wood screw nuts and bolts of small sizes, wire nail, sand paper, screw and washer for corrugated tin sheds, chains, and other fittings required for building. You may also stock wire nettings. These things you should purchase from wholesale dealers of Bombay or in the beginning you may buy from local wholesale dealers. You may write to Parmanand Jadavji Modi, Iron Market, Cafrnac Bunder, Bombay; Solem Hardware Mart, 309, Hornby Road, Bombay; and M. H. Desai & Co, 'Kerwalla Bldg., Lohar Chawl, Bombay.'

1456 S. K. V., Allahabad—(1) Recipes of contraceptive jelly will be found in Pharmaceutical Preparations published from this office. (2) It is not possible to remove hair permanently.

1457 K. N. N. N., Bassein—(1) You need not take any license for starting a soap factory. (2) You may enquire at Patent Office, 1, Council House Street, Calcutta for particulars regarding trade mark of other countries. (4) Machines you require may be had of W. J. Alcock & Co, 7, Hastings Street, and Oriental Machinery Supply Co Ltd., 20, Lall Bazar Street; both of Calcutta

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Diesel Engines, Flour Mills, Rice Mills, Dal Mills, Generating Sets, Pumping Sets, Hand and Power Pumps, Workshop Machinery, Printing, Paper Cutting, Book Binding Machinery, Braids and Ribbon Making, Soap Making, Electric Motors, Generators, Electric Tools, Welding Plants, Flexible Shafts, Plating Machinery and Materials, and every type of Woodworking and other Industrial Machinery.

BATLIBOI & COMPANY, Engineers,

Forbes St, Fort, Bombay and 4/153, Broadway, Madras.

1458 B. C., Delhi—Process of lozenge manufacture will be found in Profitable Industries published from this office. Lozenge making machine may be had of Small Machinery Manufacturing Co., 22, R. G. Kar Road, Calcutta. Wants an expert in lozenge manufacture.

1461 P. N., Karnal—Following is a list of tailoring institutes: Calcutta Commercial Institute, College Street Market; Deshabandhu Tailoring Academy, 15, College Square and Industrial Training House, 34, Bowbazar Street; all of Calcutta.

1462 S. P. M., Peshawar—(1) Industrial machines may be had of Oriental Machinery Supplying Agency Ltd., 20, Lall Bazar Street, Calcutta. (2) For materials you may try from local dealers. (3) Wants to be put in touch with the suppliers of cotton, silk and wool thread for making thread balls and reels.

1463 C. I. C., Srinagar—(1) German Exporter is published by German Exporter, Berlin-Charlottenburg 2, Germany. (2) You may consult Der Spinner and Weber, Leipzig, Germany. (3) Books on silk weaving industry may be had of D. B. Taraporevala Sons & Co., Kitab Mahal, Hornby Road, Bombay. (4) For selling silk yarn you may write to Tr. Suberg & Sohn, W. Barmen, Germany.

1464 P. D. S. C., Bombay—(1) It is not possible to manufacture celluloid on a small scale. An article on celluloid manufacture appeared in February 1934 issue of Industry. (2) Asphaltum dissolves completely and easily in chloroform, carbon bisulphide, and the different mineral oils; it is also soluble in carbonated and caustic alkalies.

1465 C. P., Gonda—For learning block making you should try to be an apprentice in a block making concern.

1466 A. C. B., Cawnpore—Unfermented lemon juice may be preserved by adding a small quantity of potassium metabisulphite, 4 oz. of the potassium compound dissolved in a half gallon of distilled water is sufficient to preserve 100 gallons of juice.

**Make Big Money
Profit 1000%**

Manufacturing specialities in spare time.
No experience or capital required. Write
for details (enclosing stamp if possible) to—
LEAGUE OF PROSPERITY PLANNERS.
2B, Bela Road, Delhi.

1467 O. P. S., Ajmer—(1) Dyes you require may be had of Fuzlehussein & Bros., 44, Armenian Street, Calcutta. (2) Perfumes may be had of Paradise Perfumery House, 75, Colootola Street, Calcutta.

1468 F. N. H., Hubli—Linseed oil is mainly used in paint and varnish manufacture and for this purpose it is exported to foreign countries in large quantity.

1469 B. L. D., Sargodha—Chemicals may be had of Butto Kristo Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta, and Bengal Chemical & Pharmaceutical Works Ltd., 31, Chittaranjan Avenue, Calcutta.

1470 I. S. S., Tinnevely—An excellent method of preserving milk is to add to every pint of it about 10 or 12 grains of carbonate or bicarbonate of soda. Milk thus prepared may be kept for 8 or 10 days in mild cold weather.

1471 V. F., Tuticorin—The fish oils possess a very complex composition. They contain quantities of highly unsaturated acids which are certainly dissimilar to linolic and linolenic. The process of refining usually consists in demargarinating and then filtering the clear oil through charcoal to bleach, occasionally a treatment with concentrated soda lyes to remove free fatty acid and improve the colour is conducted. It is not possible to solidify oil without hydrogenation. Process of hydrogenation of oils will be found in Vegetable Oil Industry published from this office.

1472 S. N. K., Srinagar—You can start a tannery with Rs. 10,000. For training in tanning you may write to the Superintendent, Calcutta Research Institute, Pagladanga, Entally, Calcutta.

1473 G. P. A., Kandy—You may refer your query to the Secretary, Oxford Mission, 42, Cornwallis Street, Calcutta.

1474 A. K. G., Calcutta—(1) You may add some plaster of Paris to the crayon. Dry it over stove. For making the crayons smooth you may use metallic mould. There is no book which deals exclusively with crayon manufacture. Yes, there are already some firms manufacturing crayons.

1476 M. C., Worur—You have to prepare cellophane tube yourself from cellophane paper. Cellophane paper may be had of C. M. Sur & Co., 105, Radha Bazar Street, Calcutta.

1477 G. N., Jandur—Matches are manufactured by Asano Bussan Co. Ltd., Yamacuchi Building, Kawaramachi 2-Chome, Higashi-ku, Osaka, Japan, and K. Doi & Co., 13, Nishi Nagahori Kitadori 1-Chome, Nishi-ku, Osaka, Japan.

1478 B. C. M. F., Ahmednagar—(1) For gunny bags write to Lachminarain Kanoria & Co., 134, Canning Street, Calcutta; Ramji

Govindji & Co., Rambaugh Street, Karachi and Damodaradas Lalji & Co., 30, Mirchi Lane, Bombay. (2) Sulphate of ammonia may be supplied by Grasselli Chemical Co., Cleveland, Ohio, U. S. A.; United Chemical & Organic Products Co., Chicago, Illinois, U. S. A.; Bradford Corporation Chemical Works, Frizinghall, near Bradford, Yorkshire and Alfred Goodall & Co. Ltd., Farrar Mill & Providence Chemical Works, Salterhebble, near Halifax, Yorkshire.

1479 P. M., Thougé—You may use starch which may be had of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta.

1481 T. B. S., Sialsuk—(1) We have no arrangement for chemical analysis. You better write to R. V. Briggs & Co. Ltd, 8B, Lall Bazar Street, Calcutta. (2) Wants large supply of mulberry seeds. (3) Same as No. (1). (4) Bakelite may be had of Mitsui Bussan Kaisha & Co. Ltd., 100, Clive Street, Calcutta. (5) You may print letter heads at your own cost. (6) Wants to be put in touch with suppliers of fire-proof paint.

1482 S. R. V., Sirsa—Books on hydro-pathic treatment may be had of N. C. Bros., 2, Baghbazar Street, Calcutta.

1496 S. M., Kurnool—For gold polish paste write to A. Paul & Co., 232A, Upper Chitpur Road, Baghbazar, Calcutta.

1497 V. P. L., Madras—Vide No. 1412.

1499 S. R. P., Paramakudi—Beeswax is not usually used in washing soap as some portion of it remains in unsaponified condition. (2) Process of manufacturing soap (similar to sun light soap) will be found in February 1935 issue of Industry.

1500 S. P. R., Bangalore City—You may take up agency of celluloid goods which may be had of Calcutta Celluloid Works, 62, Monohar Pukur Road, Kalighat, Calcutta and Jessore Comb & Celluloid Works, Basanta Kutur, Jessore.

1503 P. S., Budaun—(1) Castor oil makes the soap glossy. (2) Smoothness of soap depends upon the stuff used and manipulation. (3) You may use soap colour which may be had of Fuzzlehussein & Bros., 44, Armenian Street,

Calcutta. (4) Soap colours are not manufactured in India at present. (5) To stand against competition try to purchase raw material at cheapest rate possible.

1504 L. S., Amritsar—Formulas of tooth paste, etc. will appear in an early issue of Industry.

1506 H. V. D., Rajkot—(1) Button making and envelope making machines may be had of Oriental Machinery Supply Agency Ltd., 20, Lall Bazar Street, Calcutta. The above firm will supply you with detail information you require. (3) Battery making machine may be had of Industrial Machinery Co., 14, Clive Street, Calcutta.

1509 D. V. T., Bombay—(1) Woven labels may be supplied by Carl Neiss, Kunstweberei Krefeld, Germany. (2) Thread ball making machines may be had of Oriental Machinery Supplying Agency, 20, Lall Bazar Street, Calcutta.

1511 S. V. M., Ankleshwar—(1) Paris gold or imitation gold is an alloy which resembles gold in some points. (2) Wireless telegraphy and radio being a new line still has good prospect. (3) Books on the subject may be had of Book Co. Ltd, 4/3A, College Square, Calcutta. (4) You need not demand any commission yourself but try to exact highest offer from the party. (5) You may produce electricity by battery or dynamo. (6) Electricity produced by battery cannot produce enough light for photo work. (7) Petromax light may be used. (8) Wants to be put in touch with dealers in Paris gold ornament. (9) For torch light of required power write to General Electric Co. Ltd., Magnet House, Chittaranjan Avenue, Calcutta. (10) Process of manufacturing flash light powder will be found in July 1934 issue of Industry. (11) Settle your terms according to your liking. (12) Same as previous. (13) Magnesium wire (electric wire) is known as flash light electric wire. (14) An article on dry cell making appeared in May 1934 issue of Industry. (15) You may write to Postal Department for used battery.

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Write for particulars or see Demonstration at
DON, WATSON & CO.,
19, British Indian Street, Calcutta.

1512 B. N., Amraoti—Fountain engraving machine may be had of B. M. Sarine & Co, Lakhmandas Bldg., Mangaldas Road, Kalbadevi, Bombay.

1513 S. K. K., Poona City—Process of manufacturing brushes will be found in Profitable Industries published from this office.

1514 P. L. A., Ferozepore—You may start a factory for manufacturing locks. For this purpose you may invest Rs. 1,000. In the beginning you may appoint some mistries that are working at Aligarh, the centre of lock industry. For machines write to Taylor & Challen Ltd., Birmingham, England.

1517 B. P., Mirzapur City—Nickel occurs in nature as the arsenide kupernickel and also as a silicate.

1522 B. S. K., Gujarkhan—Following is a list of tanning institutes: Calcutta Research Tannery, Pagladanga, Calcutta; Government Leather Working School, Cawnpore; Government Tanning School, Fatehpore and Leather Trades Institute, Madras.

1524 P. I. H., Rawalpindi—Your letter has already been replied by post.

1526 M. D. E., Palestine—(1) Formula of Turkish delight and Egyptian hulwa will appear in an early issue of Industry. (2) Coconut oil may be had of Adam Hajee Peermohamed, 2, Amratala Street, Calcutta and D. M. Lockat, 66, Canning Street, Calcutta. (3) For books on fish canning write to D. B. Taraporevala Sons & Co., Kitab Mahal, Hornby Road, Bombay. (4) Oil extracting machine may be had of Krupp Indian Trading Co., Ltd., 29, Strand Road, Calcutta.

1530 S. K. S., Basurhat—Chanachur bhaja preparation will appear in an early issue of Industry.

1531 A. M. P., Pattambi—We do not deal in other's publication. You may however write to Bengal Secretariat Book Depot, Writers' Buildings, Calcutta.

1536 K. C. A., Meerut City—(1) Try to be an apprentice in a block making concern such as King Halftone Co., 22, Wellington Street and Bharatvarsha Halftone Works, 201, Cornwallis Street; both of Calcutta. (2) You may also consult Independent Careers for the Young

published from this office. (2) You may consult Pees and Bee-keeping by Chesire. (3) Address of wine tablet dealer is not known.

1939 C. C. S., Shillong—(1) Incubator may be had of W. Leshe & Co., 19, Chowringhee, Calcutta. (2) Match making machines may be had of Bhawani Engineering Co. Ltd., 56, Gourbari Lane, Shambazar, Calcutta.

1540 R. V. R., Karachi—Celluloid sheets may be had of Mitsui Bussan Kaisha & Co. Ltd., 100, Clive Street, Calcutta; T. Chatani & Co. Inc., 1-5, Higashi Shimizumachi 1-Chome, Minami-ku, Osaka, Japan and Iwai & Co., 43, Kitahama, 4-Chome, Higashi-ku, Osaka, Japan.

1542 H. L. G., Delhi—The bakelite is registered trade mark which denotes product of Bakelite Ltd. of London. Birmingham and Darby Dale. There are several bakelite products, including moulding materials, resins, enamels, transparents, insulating varnishes, silent gear materials and laminated sheet, the latter being the form which is most applicable to amateur craftwork. This is a dense strong, solid material, produced by the application of heat and pressure upon superimposed layers of paper and fabric, impregnated with bakelite synthetic resin. It is non-hygroscopic, tough, strong resilient. It is resistant to heat cold acids, chemicals, oils, fumes and high electrical voltage. Bakelite is light in weight; yet moisture and constant handling with oily or grease-stained fingers cannot warp or mar it. Its colours are permanent and will not fade. Its resistance to heat, cold, rain, ice snow and salt air make it ideal for electrical insulation. It resists wear well and makes silent contacts when used in moving parts. As a dielectric it does not deteriorate with age. Its strength permits manufactured parts to be made thin, thus reducing the clearance that might otherwise be required.

1543 D. D., Hyderabad—A series of articles on extracting active principles from medicinal herbs appeared in 10th. volume of Industry which is out of stock.

1544 N. S. S. C. N. B., Madura—Process of purifying sugar will appear in an early issue of Industry.

1549 G. C., Seoni—Lightning conductor will be installed by building contractors. You may communicate with Martin Co., 12, Mission Row and A. K. Sanyal, 1, British Indian Street; both of Calcutta.

1550 M. J. C., Bombay—(1) Hindi equivalent of orris root is keora ka mul; Gujrati equivalent of cassia is garmala; vernacular equivalent of other articles are not known. (2) Wants to be put in touch with suppliers of honey of roses, rotenone and oil pyreth-

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rum. (3) Process of manufacturing monople soap will appear in an early issue of Industry. Following is a recipe of mosquito lotion: Oil of pennyroyal 8 oz.; oil of sassafras 7 oz.; methylated spirit 16 parts. Mix. To drive off mosquitoes shake the bottle and spray a quantity of the solution with a sprayer. (5) Without seeing the sample we cannot supply you the formula.

1553 B. T. C., Madras—(1) It is not possible to manufacture marketable soap at Rs 2/- per maund. (2) Rose oil may be had of Paradise Perfumery House, 75, Colootola Street, Calcutta.

1554 M. A. S., Sijua—Yes, pure butter can be sold in Calcutta market. Formula you require will appear in an early issue of Industry.

1555 A. V. G. A. N., Madura—For earthenware closets write to Rose Hill Pottery Co. Ltd., Woodville, Burton-on-Trent, England, and Johnson Alf & Son Ltd, 14, Newington Butts, London S. E. 1.

1558 H. S. M., Saharanpur—(1) You may consult Leather Manufacture by Watt. (2) Process of manufacturing solid disinfectant will be found in Manufacture of Disinfectant and Antiseptics published from this office. (3) Formulas of boot polish will be found in December 1934 issue of Industry.

1563 L. K., Basti—(1) Following is a list of glass factories: Sree Gobindeo Glass Works, Ramrajatala, Howrah; Victoria Glass Works, Ghosery, Howrah; Bombay Glass Manufacturing Co., 51, Naigum Road, Dadar, Bombay; Bengal Glass Works Ltd, Church Road, Dum Dum, near Calcutta; Bharat Glass Works, 107, Dum Dum Road, Calcutta; Allahabad Glass Works, Naini, Allahabad and Nagina Glass Works, Nagina, Bijnor, U. P. (2) You may sell glass wares through agents. (3) No such Urdu Journal is known to us.

1564 R. A., Bombay—Anatomical models may be had of Powell & Co, Lamington Road, Bombay, and Paul & Co., 3, College Square, Calcutta.

1566 S. N. G., Dharwar—Cotton seed decorticating and oil extracting machines may be had of Mirrless Watson & Co. Ltd., Post Box No. 2096, Calcutta. For books on cement manufacture write to Book Co. Ltd., 4/3A, College Square, Calcutta.

1567 M. F. R., Jamshedpur—(1) You should use dried amla. (2) Hicco essences, alkanet root, etc. may be had of Paradise Perfumery House, 75, Colootola Street, Calcutta. (3) Hamamelis cannot be prepared in India. You may use extract hamamelis which may be had of Butto Kristo Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta. (4) B. P. stands for British Pharmacopoea. (5) Oil of theobroma

may be had of Butto Kristo Paul & Co. Ltd, Calcutta. (6) You may prepare egg whisk yourself by beating the egg continually. (7) Quince is known as 'bael.'

1569 S. N. K., Multan City—Reply to your query appears in July 1935 issue of Industry.

1570 K. R., Tanuku—(1) You may add sodium metabisulphate for preserving butter. (2) Now sugar is not manufactured from palm jaggery.

1572 B. P., Madras—Collapsible tube filling machines may be had of Industrial Machinery Co, 14, Clive Street, Calcutta.

1574 J. S. K., Ghatkoper—You may take up agency of unrepresented insurance companies in Bombay. For this business you will not require any capital.

1576 S. R. J., Takari—For selling graphite advertise in classified bargain pages of Industry.

1577 H. C. M., Rangoon—Wants to be put in touch with the manufacturer of "Swastik" confectionery.

1579 P. J. C., Madras—We cannot trace the address of the manufacturer of the particular label sent by you. Woven labels may be had of Carl Neiss, Kunst-weberei Krefeld Germany.

1580 N. C., Bangalore City—Chemical plants and stills may be had of W. J. Alcock & Co, 7, Hastings Street, Calcutta.

1581 M. P. S., Bhadohi—Vide No. 1321.

1582 I. A. C., Ernakulam—(1) You may consult Indian. Materia Medica by K. M. Nadkarni to be had of the author at Post Box 3558, Bombay. (2) Cast iron goods may be had of Bengal Iron Works, Kult; Burn & Co., 12, Mission Row, Calcutta; Foundry & Railway Equipment Co. 100, Clive Street, Calcutta and Dragon Iron Works, Bandaghat, Salkia, Howrah.

1583 B. H. Nagercoil—Following is a list of richmen:—Henry Ford, Dearborn, Michigan, U. S. A.; John Davidson Rockefeller, 4, West 54 Street, New York; John Pierpont, Morgan, 231, Madison Avenue, New York, U. S. A., and Charles M. Schwab 25, Broadway, New York City.



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A radical cure for RING-WORM and all sorts of Skin diseases.

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1584 A. C. P. C., Colombo—Process of manufacturing chocolate and vegetable ghee will appear in an early issue of Industry.

1587 V R S., Kankasanturai—Following is a list of merchants you require: W. Angliss & Co. Ltd., 42, Burke Street, Melbourne, Victoria, Australia; J. Antomiadis Gwelo, South Rhodesia, S. Africa; Butcher & Sons Ltd., P. O. Box 1004, Durban, Natal S. Africa and Brown Thomas & Sons Ltd., Eagle Street, Brisbane, Queensland, Australia.

1588 H. B. K. B., Katmandu—(1) Please write clearly what is wrong with the boot polish manufactured by you so that we can supply you further instruction for rectifying the defect. (2) Melt the ghee again with some leaves of lemon. (3) You can preserve fish in a refrigerator for 24 hours. (4) Wants to buy rotenone. (5) Veterinary books may be had of Chakraverty Chatterjee & Co. Ltd 15, College Square, Calcutta. (6) For the machine you require write to W. J. Alcock & Co., 7, Hastings Street, Calcutta (7) No such looking glass is known to us.

1593 B. M. B., Maghiana—(1) Write with cobalt chloride. Hold the paper over fire when letters will appear. (2) Yellow soap is ordinary bar soap like sunlight soap. Beeswax is ordinary wax obtained from beehive. (3) Kumkum is saffron. (4) The polli oil (the oil of *carthamus oxyacantha*) expressed by the cold process is placed in earthen vessels and boiled continuously for twelve hours. The vessels are so placed that it is not possible for a flame to reach the boiling liquid, and the temperature is kept low and uniform. Sometimes it emits volumes of white pungent vapour, so exceedingly disagreeable that the manufacturers are compelled to conduct their industry under special license and in a place assigned to them remote from human dwellings. On the oil being cooked to the required extent and while still boiling hot, it is thrown into large shallow trays containing cold water. It swells up into a jelly-like substance, the roghan of Northern India. This is stored in tin cans and sold to the manufacturers of the so called Afridiwax cloth. Wants to buy roghan oil. (5) For preparing caraway water triturate caraway oil with twice its weight of

calcium phosphate and five hundred times its volume of distilled water and filter the mixture. (6) You may burn the ivory waste and the ashes may be used in medicine. (7) Cotton seed oil may be used in soap making but cannot be used as ghee. (8) Powdered soap nut cannot be used in soap manufacture. (9) Dye soap is 'monople' soap. (10) Dry cleaning is carried without using water. (11) Milk of lime is saturated solution of lime. (12) Following is a list of industrial magazines: Industrial Britain published by Hogg & Knight, 149 Strand London W. C.; Industries Illustrated published by Mayfair Ltd., 43 & 44 New Bond Street, London W. 1. and Popular Mechanics Magazine published by Popular Mechanics Co., 200, East Ontario Street, Chicago, U. S. A. (13) You may use net for preventing warpr. (14) Consult a physician.


1595 M. V. R. N., Pondicherry—Petroleum lamps may be supplied by Standard Light Co. Ltd., Francfort Main, Germany and Geppert & Stadelmaun G.m.b.H., Nürnberg, Veilodterstr 1, Germany.

1598 P. C. I. W., Okara—Colour may be had of Fuzlehussein & Bros., 44, Armenian Street, Calcutta.

1604 A. M. V., Kottayam—(1) Sundried powdered banana can be preserved in tins for long. (2) If you mix sugar with it the whole will keep in good condition for longer time (3) Process of preparing malt will be found in July 1935 issue of Industry.

1605 C. J. J., Quilon—(1) It is not possible to prevent fermentation of treacle. (2) Can supply treacle in large quantity. (3) For preserving pineapple juice cut the pineapple in pieces and press out all the available juice by means of a wooden press and strain through 2 or 3 folds of clean fine muslin cloth. Now heat the juice in a porcelain or earthenware vessel to a temperature between 160° to 165°F (not lower and never higher, as the flavour will be adversely affected). When boiling is over pour the juice in hot dry bottles previously sterilised that is to say, they are placed in boiling water for some time and then dried. When the juice is nearly cold, cork them firmly and tie these down to necks of bottle with strong twine or string. Next immerse the filled bottles in fairly hot water and apply heat until the temperature of the water is raised to 165°F and maintained constant for half an hour. Allow the bottles to cool and when cold enough their cork heads are inverted and immersed in hot paraffin wax to seal the contents from outside air.

1606 J. P., Meerut City—You may send your students to Government School of Arts and Crafts, Lucknow.



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lisation of Insurance
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Calcutta.

1607 G. L. F., Sikkim—(1) Bottle caps and bottles may be had of Shah & Co., 55, Ezra Street, Calcutta. (2) Unfermented citrus fruit juice may be preserved by adding a small quantity of potassium metabisulphite. 4 oz. of the potassium compound dissolved in a half gallon of distilled water is sufficient to preserve 100 gallons of juice.

1608 A. S. B. C., Agra—All the ingredients you require may be had of A. C. Dutt, 23/2, Dharamtala Street; Akhoy Kumar Laha, 1, Dharamtala Street and G. C. Laha, 1, Dharamtala Street; all of Calcutta. The above firms will also supply readymade paint and varnish to be applied to brush handles.

1609 K. C. A., Nellimarla—For grinding machine write to Dr. Bose's Laboratory Ltd., 45, Amherst Street and W. J. Alcock & Co. 7, Hastings Street; both of Calcutta.

1610 K. S. R., Bezvada—(1) Paddy husking and flour grinding machine may be had of Bantra Engineering Works, 233, Belihos Road, Bantra, Howrah; International Trading Co., 13, Clive Street, Calcutta and Shankerlal Bisslerlal, 30, Clive Street, Calcutta. (2) For limestone mortar write to Balmer Lawrie & Co Ltd, 103, Clive Street and Marshall Sons & Co Ltd, 99, Clive Street; both of Calcutta.

1612 M. L. M. C., Gujranwala—For vulcanising apparatus write to Howrah Motor Co., Norton Bldgs, Lall Bazar, Calcutta.

1613 D. S., Gohana—(1) You may try the following formula: Tallow 1 md.; rosin 24 srs; caustic soda 9½ srs.; water 22½ srs. (2) Refine mohua oil before using in soap making.

1615 P. H. T., Zanzibar—Perfumes and essences may be had of Paradise Perfumery House, 75, Colootola Street, Calcutta.

1617 W. H. D. C., Bombay—You may consult Indian Ghee Problem by Mr. J. A. Hare Duke to be had of the author at H. B. Technological Institute, Cawnpore.

1618 G. V. V. S. R., Masulipatam—(1) Coffee may be had of A. J. Saldon & Sons, Mangalore; Jeppo Coffee Curing Works, Jeppo, S. Kanara and M. Navaraju & Co., Mangalore, S. Kanara. (2) Tea may be had of Ambari Tea Estate, Chaharpore, Dehra Dun; Goodrich Tea Estate, Chaharpore, Dehra Dun; Aryan Planters Agency, 7, Mission Row, Calcutta; Bhattacharjee & Co. Ltd, 57, Cornwallis Street, Calcutta and Golden Leaf Tea Co., 11, Clive Street, Calcutta.

1619 U. P. W., Trichur—Formulas of wood oil, polish, etc. will appear in an early issue of Industry.

1621 S. H. C., Jalgaon—An article on incandescent gas mantle manufacture will be found in May, 1934 issue of Industry.

1622 N. R. R., Chondi—Process of testing

purity of ghee and preserving ghee will appear in an early issue of Industry.

1625 M. T. T., Calicut—For taking impression of palm you may use thumb impression ink.

1628 K. M., Karur—Sewing thread may be supplied by Dacca Twist Co., 36, Princess St., Manchiester; English Sewing Cotton Co. Ltd, Arkwright House, Manchester and J. & P. Coats Ltd, 50, Bothwell Street, Glasgow.

1637 G. S., Pennsylvania—One dollar is equal to Rs 2 68 approximately.

1639 L. E. W., Kallai—(1) Tender is called for supply of envelopes by the Postal Department every year. (2) Following is a recipe of envelope gum: Take 1 part each of gum arabic and starch; add 4 parts of sugar; water sufficient quantity. Dissolve gum in water; add the sugar and the starch. Boil the mixture for a few minutes to dissolve the starch. Dilute the mass according to thickness required. (3) Envelopes are made by A. K. Chowdhury, 5, Ezra Street, Calcutta; Standard Stationery Manufacturers Ltd, 167, Old China Bazar Street, Calcutta and Mohamedally Hibathboy & Co., 15, Mirza Street, near Abdul Rehman Street, Bombay. (4) Envelope making materials may be had of C. M. Sur & Co., 105, Radha Bazar Street, Calcutta. (5) Import duty varies according to classes of paper.

1640 A. L. T., Irinjalakuda—(1) For textile machine write to W. H. Brady & Co., Mercantile Bldgs, Lall Bazar, Calcutta. (2) Following is the process of dyeing yarn black. Allow powdered gallnuts 2 srs. in weight, to soak in 15 srs. of hot water in an iron pan for 6 days and bring to boil till 12 srs. of the liquor is left. Keep the pan aside with the liquor for 10 days. Then strain through a cloth and add 1 oz. of pyrogalllic acid. Then steep previously bleached yarn into this solution for 1 day and finally remove, wring and dry. (3) Before dyeing yarn you should bleach it to obtain best result. (4) For all kinds of machineries write to A. N. Marr Ltd, Globe Road, Leeds. (5) The Dyer is published by Heywood & Co. Ltd, Drury House, Russell Street, Drury Lane, London W.C.2.

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HOUSE OF COMMERCE,
Ulubari Road, Gauhati, 34.

1644 P. L. K., Ajmer—(1) Artificial silk yarn may be had of D. M. Kapur, Watkins Bldgs., 76, Tamba Kanta Pydhowmie, Bombay; Gordhandas Ishardas, 93, Tamba Kanta, Pydhowmie, Bombay; Hazarat & Co., Near Hongkong Bank, 160, Cawasji Patel Street, Bombay, and W. H. Brady & Co., Ltd., Bombay. (2) Crochet cotton may be had of E. B. Bros. & Co., 58/4, Canning Street, and Lakoder Mullick, 183, Dharamtala Street; both of Calcutta. (3) Artificial silk yarn is not manufactured in India. (4) Electroplating equipment may be had of S. Mitra & Co., 210, Girgaum Road, Bombay. (4) You may consult Electro-plating and Electro-refining by Watt & Philip.

1645 M. B., Patnaudi State—You may consult Manufacture of Soap published from this office.

1646 K. S., Gujranwala—Refer your query to the High Commissioner for India, India House, Aldwych, London W.C.

1647 R. K. A., Pilbhit—(1) Rouge may be had of A. Paul & Co., 232A, Upper Chitpur Road, Baghbar, Calcutta. (2) Following is a formula of rouge: Make a solution of iron sulphate and another of oxalic acid. Add the latter to the former as long as it throws down a precipitate. Filter off the liquid and wash the residue on the filter with repeated charges of water and dry. When dry, place in a suitable container and heat gently. It soon ignites and burns until only an impalpable powder is left. This is the polishing material. (3) Your formula of silvering solution is not correct. Make the first solution by dissolving 12 grains of tartrate in 12 oz. of distilled water. Second solution is prepared by dissolving 16 grains of nitrate of silver in 1 oz. of water. The solution is boiled for several minutes. Then ammonia is added to the solution. A brown precipitate is formed. A little more ammonia is then to be added. The precipitate dissolves. Excess of ammonia must be avoided. Equal portion of the two solutions are mixed together when silvering.

1649 M. S., Sangamner—Yes, you may manufacture soap with groundnut oil but the soap will be soft. To remedy this defect you

should use coconut oil with it. Process of manufacturing all kinds of soaps will be found in Manufacture of Soap published from this office. For expert advice you may refer to Mr. R. Ghose, Soap Expert, 8, Kripanath Lane, Calcutta.

1651 A. I. S. A., Srinagar—Dyes may be supplied by Japan Dyestuff Manufacturing Co. Ltd., 199, Kasugadecho, Konohana-ku, Osaka, Japan.

1652 J. S. M., Birlapur—Formulas for disinfectant tablets, caustic soda, etc. will appear in an early issue of Industry.

1655 M. M. H. B., Montgomery—(1) You can make briquettes of saw dust using waste molasses as a binding agent. Make a paste of saw dust mixing molasses of required quantity. Make bricks of required size by using wooden form. Dry in the sun and these may be used as fuel. (2) For preparing glue with waste leather you need not use any machine. Follow the process as described in our journal and you will get the required result.

1656 M. P. U., Moradabad—(1) For motor training write to The Great Indian Motor Works Ltd., 12, Government Place East, Calcutta. (2) For training in electrical and mechanical engineering write to Bengal Engineering College, Shubpur, Howrah; College of Engineering and Technology, Jadavpur, 24 Parganas, Bengal, and Benares Hindu University, Benares.

1657 B. G. N., Nagpur—(1) An article on incandescent gas mantle manufacture appeared in June 1933 issue of Industry. (2) You perhaps mean process frosting of glass which follows: Cover the glass with a layer of wax or of varnish on which the designs are traced with a graver or pen-point; next hydrofluoric acid is poured on the tracings. This acid is very dangerous to handle, for this reason it is better to proceed in the manner as directed below which does not present this drawback: Take powdered fluoride of lime 1 part and sulphuric acid 2 parts. Make a homogeneous paste which is spread on the parts to be frosted. At the end of 3 or 4 hours wash with water to remove the acid, next with alcohol to take off the varnish or with spirit of turpentine if wax has been employed for stopping off. (3) Formulas of fountain pen ink will be found in August 1934 issue of Industry. (4) You may add a few drops of acetic acid. (5) Your query is unintelligible. (6) Process of manufacturing tobacco tincture and spirit of turpentine will appear in an early issue of Industry. (7) For joining broken bangles you may use glass cement. (8) There are three kinds of rosins of which medium and black rosin should be taken in equal quantity to make the disinfecting fluid black. (9) Other formulas you require will appear in an early issue of Industry.

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Our representative is on tour at Nagpur, Ahmedabad, Bombay etc. Firms desiring samples and ready settlement of terms may call his interview. Please write to:
SCIENTIFIC PRODUCTS CO.,
6, Kirti Mitter Lane, Calcutta.

1659 B. S. S., Gauhati—(1) Lozenges may be had of Das Samanta & Co., 119C, Grey Street, and Fine Confectionery Works, 170, Cornwallis Street; both of Calcutta. (2) Wants to be put in touch with the manufacturers of fibre suit cases.

1660 G. S. R., Indore—(1) Chemicals may be had of B. K. Paul & Co. Ltd, 1 & 3, Bonfields Lane, Calcutta. (2) Colour may be had of Fuzlehussain & Bros., 44, Armenian Street, Calcutta. (3) Formula of cloth stamping paste will appear in an early issue of Industry. (4) Tin cans may be supplied by Marni Sakujiro Shoten, Andonbashi-dori, 4-Chome, Minami-ku, Osaka, Japan and Nakana, Kojo, 301, Nocho 2-Chome, Higashinari-ku, Osaka, Japan. (5) Hindi equivalent of gelatine is not known.

1661 D. B., Bulsar—A formula of cloth bleaching mixture will appear in an early issue of Industry.

1664 H. R. P., Andheri—You may start business of Indian goods. Also you may transact business on contract system. Tenders are invited by various departments of Governments. Municipalities, District Boards, etc. You can place tender and if you are successful in securing a tender supply the goods as required. This sort of business proves lucrative.

1665 S. K. B., Jaipur City—(1) You perhaps want a formula of liquid hair dye. Following is a formula of liquid hair dye: Nitrate of copper 360 grains; nitrate of silver 7 oz.; distilled water 60 oz.; ammonia water qs. Dissolve the salts in the water and add ammonia water carefully until the precipitate is all redissolved. This solution if properly applied, produces a deep black colour. Copper sulphate may be used instead of copper nitrate. (2) Imitation gold may be had of Calcutta Rolled Gold & Carrat Gold Syndicate, 8/9, College Street, Calcutta.

1666 A. N. R., Madras—For chemical analysis you may write to Sudhindra Nath Sen, 6, Kirti Mitter Lane, Shambazar, Calcutta and R. V. Briggs, 8B, Lall Bazar Street, Calcutta.

1667 M. M. C., Mahbubabad—For slate frame making machine write to Krupp Indian Trading Co. Ltd, 29, Strand Road, Calcutta.

1668 N. D. O., Batala—Piecegoods may be had of Beinjraj Hookumchand, 60, Cotton Street; Chaturbhuj Gordhandas & Co., 23, Pollock Street and Laxmichand Baijnath, 31, Cotton Street; all of Calcutta.

1669 K. L. B., Multan Cantt—(1) Following is a recipe of lime juice cordial: Sugar 6 lbs.; water 4 pints; citric acid 4 oz.; boric acid $\frac{1}{2}$ oz. Dissolve by the aid of gentle heat and when cold add refined lime juice 60 oz., tincture of

lemon peel 4 oz., water to make up to 2 gallon, and colour with caramel. (2) For preserving pomegranate juice strain it through 2 or 3 folds of clean fine muslin cloth. Now heat the juice in a porcelain or earthenware vessel to a temperature between 160° to 165°F (not lower and never higher as the flavour may be adversely affected). When boiling is over pour the juice in hot dry bottles previously sterilised that is to say, they are placed in boiling water for some time and then dried. When the juice is nearly cold cork them firmly and tie these down to necks of bottle with strong twine or string. Next immerse the filled bottles in fairly hot water and apply heat until the temperature of the water is raised to 165° F and maintained constant for half an hour. Allow the bottles to cool and when cold enough their cork heads are inverted and immersed in hot paraffin wax to seal the contents from outside air. (3) You may add insect powder to mosquito lotion for destroying the mosquitoes.

1670 D. D. P., Delhi—You may start a soap factory for manufacturing washing soap with Rs 500 as initial capital. You may also open a commercial coaching institute for coaching students in book keeping, business organisation, shorthand, typewriting, etc. This line will suit you best as you are a commerce student.

1672 L. K., Aijal—(1) Tin sheets may be had of Indian Tin Plate Co., Golmuri, B. N. Ry. and Tata Iron & Steel Co. Ltd., Jamshedpur, B. N. Ry. (2) Process of dyeing wool black will appear in an early issue of Industry. (3) You may refer your query to the Secretary, Royal Calcutta Turf Club, 12, Russell Street, Calcutta.

1673 Z. H. K., Kiratpur—Process of manufacturing glycerine, and bleaching castor oil will appear in an early issue of Industry.

1674 J. K. S., Insein—For extracting oil you should use ghanny which may be had of International Trading Co., 13, Clive Street, Calcutta and Bantra Engineering Works, 233, Belihos Road, Bantra, Howrah. No hand machine is available for extracting oil from oil seeds.

1675 S. C. J., Mandalay—Process of dyeing jute will appear in an early issue of Industry.

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REVIEW OF BOOKS

STEPS TOWARDS INDIAN HOME RULE by Marquis of Zetland, G. C. S. I., G. C. I. E., F. B. A. Published by Hutchinson & Co. Ltd., 34, Paternoster Row, London E. C. 4. Pages 128, Price 5 sh.

The publications expressing the British point of view on the Indian constitutional question must be a legion. But a special importance attaches to the book under review not only because Lord Zetland has recently been appointed the Secretary of State for India but because Lord Zetland has an intimate understanding of Indian administrative problems, Indian aspirations and Indian culture.

The book covers a wide ground from the Report of the Simon Commission to the recommendations of the Joint Select Committee on Indian Constitutional Reforms, except for the brief period when the author had been away in Canada to lecture on Indian problems. The discussions on the various aspects on the question have been protracted and the march of events has also lent new orientation to the evolution of the new constitution. Literature growing about these discussions is prodigious in volume and it is quite impossible for one to follow the events and the gradually developing ideas from these voluminous Reports. Lord Zetland in his book makes an attempt to narrate the principal points linking the chequered history behind the India Bill as it emerges out of the Houses of Parliament.

Opening with an account of Great Britain's achievement in India, Lord Zetland passes on to discourse on the salient features which mark the famous Simon Commission Report. Then follow a graphic account and estimate of the deliberation in the first two Round Table Conferences with lively reflections on men and matter, and the breakdown of talks with regard to the solution of communal problem. In the closing chapter Lord Zetland presents the principal recommendations and changes suggested in the White Paper. The author had been in close contact all through with this Committee and had taken a leading part in the deliberations. His views on the various Indian problems are scattered all through the book and though the Indian view point on these questions may differ from his, his opinions should demand a respectful hearing.

MONEY, FOREIGN TRADE AND EXCHANGE by H. J. Welch. Published by George

Allen & Unwin Ltd, 40, Museum Street, London. Pages 158, price 4 s. 6d.

Mr. Welch has been closely connected with business for a long time and is a Vice-President of the British Association of Commercial Education. Being in touch with commerce all through, he is one of the fittest persons to express the difficulties standing in the way of expansion of trade in these days. Mr. Welch is therefore to be congratulated upon bringing out the present book embodying his reflections about the formulation of the policy relating to money, exchange and foreign trade as are deemed to be helpful in ensuring national prosperity.

So long England had allowed international considerations to prevail over her domestic requirements. The present book is a call to the economists to view the economic problems that perturb England from a quite national point of view when the volume of foreign trade is gradually shrinking.

The book starts with an interesting analysis of what national and international money is and examines critically the financial policies of the day and suggests how these should be remodelled to serve the greatest interests of the country. Mr. Welch urges that the note issue should be unlimited but notes should be put in circulation only to the extent of the actual requirements of the public. He also advocates restriction of foreign loans and investments under certain conditions as a creditor country can never collect payment of its debts or of its interest without accepting an excess of imports over exports. Mr. Welch explains that the present economic depression is largely the outcome of unwise international loan and investment policy.

Whether England should return to gold standard has been the point of discussion among economists. Mr. Welch is definitely of the opinion that England should not return to any gold standard; but if she does so that should be to a gold bullion standard on more flexible than those operating hitherto.

SOCIALISM VICTORIOUS. Published by Co-operative Publishing Society of Foreign Workers in U. S. S. R., Moscow-Leningrad. Pages 719.

The book under review is a symposium by such eminent men as Stalin, Molotov, Kaganovich, Voroshilov, Kuibyshev, Orjonikidze and Manuilsky—men who have made the U. S. S. R. what it is to-day. The book is a vindication of

the policy which U. S. S. R. adopted after the over-throw of the Czarist regime to avert terrible economic chaos at home in the teeth of strongly adverse criticism about the soundness of the new policy. The successful termination of the first five year plan has encouraged the leaders to embark upon a second five year plan.

The book opens with a survey of the present U. S. S. R. by that leader among men, Stalin. He points out the growing acuteness of the economic and political situation in the capitalist countries and estimates the progress made in U. S. S. R. in the field of industry, agriculture, trade and transport. The tasks of the second five years are foreshadowed by M. Molotov and V. V. Kuibyshev. These articles lay the constructive programme and the distribution of productive forces in the coming years, raising the standard of living, facilitating transport, strengthening heavy industries, etc. No less interesting is the article from the pen of L. M. Kaganovich on organizational problems of Party and Soviet Constructions. He characterises the ideological equipment of the party members and urges that the party is strong in the unity of will and action, in the activity, and self-sacrifice of the party as a whole and of each individual member.

In another article Mr. D. Z. Manuilsky analyses the conditions in the capitalist countries after five years of intense economic suffering and anticipates the breakdown of the present system in near future.

Though socialism is a far cry in India, nevertheless a study of the the organisation and methods which mark out the economic life in U. S. S. R. will help India in chalking out a plan for her economic development in her own line.

FASCISM OR SOCIALISM? THE CHOICE BEFORE US by Norman Thomas. Published by George Allen and Unwin Ltd., 40, Museum Street, London. Pages 249, price 7s. 6d.

Norman Thomas requires no introduction to the well informed quarter. He is one of the eminent Americans of the present day and contested President Roosevelt on the last presidential election in the U. S. A. He has already made a name by writing a book *America's Way Out*, envisaging the programme that will help America to come out of the troubles she finds herself to be unfortunately in.

The present book is based on broader foundation. If the former book sought to restore peace and plenty to America, the present volume makes an attempt to remove the economic ills from which the whole world suffers terribly. Mr. Thomas starts with an interesting account of this troubled world with hallucinations of war.

Conditions in Europe, Africa and Far East are ominous in spite of numberless international conferences, the establishment of a permanent World Court, the League of Nations, and the supposed outlawry of war by the Kellogg-Briand Pact. Mr. Thomas then proceeds to enquire what is wrong with the world and points out that we are victims to a particularly virulent form of economic nationalism and to our failure to build a self-sufficient national economy. The old order has crumbled down. The economic doctrines which prevailed in the pre-war days are found wanting in incisiveness and strength in the coming days.

In the face of these economical perplexities, man was not a fool to believe that a new order of things will evolve automatically without any attempt on his part. Different schools of thought have appeared in the field under the guidance of prominent leaders. Italy is trying Fascism, Russia is experimenting with Socialism, U. S. A. with New Deal. The basic differences between the different view points are carefully analysed. Mr. Thomas, however, does not put his confidence on any of the systems. In his pleasantly forceful style he advocates the founding of a Co-operative Commonwealth based on socialism. His keenly analytic brain does not remain satisfied with the object. He devotes a considerable part of his book on the statement of the broad principles on which the structure of co-operative commonwealth can be erected.

Mr. Thomas's idea smacks of Utopianism, hard to be realised in this divided world. Still his views should be widely ventilated among all classes of people and among economists and politicians in particular.

HEALTH by E. Obermer, M.D. Published by John Lane the Bodley Head Ltd., Vigo Street, London W. Pages 171, price 3s. 6d.

There is considerable misconception about health even among the intelligent class of people. They do not consider it worthwhile to seek medical advice unless they suffer from some gross disease or disability. They are not yet conscious of health as a positive conception, i.e. continuous well-being under all circumstances, or optimum adaptation of the individual to the environment. With the expansion of scientific knowledge, the preventive methods of treatment should engage equal attention, if not more, as the curative methods. If a watch or a motor requires overhauling from time to time, then the human body, one of the most complex machines on earth, should also demand attention on the ground of readjusting the loose balances and revitalising the worn out or exhausted portions.

Dr. Obermer has therefore done a significant service to humanity by drawing the attention of the public to this side of the problem. In making a survey of medical organisation in modern community he finds that the medical profession is occupied in the palliative treatment of symptom or diagnosing and treating disease. On the other hand the patients drift from specialist to specialist for advice, go to health resorts and have osteopathic, massage and other physical treatment on their own initiative.

The author here draws out the difference between the problems of public and individual health. There are institutions at present to look after public health and sanitation but there is hardly any constructive thinking about ensuring individual health.

Dr. Obermer in his book puts forth a strong plea for an individual health service. According to his plan a medical practitioner would possess the centralised responsibility for a certain number of individuals. It should be his duty to consider each individual as a separate problem in applied physiology. The health practitioner should ask himself every time that he saw a subject under his care the following question: "Is this individual adapting himself or herself in the best possible way to his or her particular environment." He should follow up the subjects, read just the balance and look after their general welfare.

It is thus a new subject of immense importance to every man and medical practitioner. Various subjects need investigations before the health practitioner can give sound and healthful advice. The book indicates the line in which investigations should be carried on.

HOW TO GET THINGS DONE by Herbert N. Casson. Published by Efficiency Magazine, Kent House, 87, Regent Street, London W.1. Page 143, price 5 sh. net.

India is a land of philosophers. Here the educated and the uneducated, the literate and the illiterate, are temperamentally given alike to the sway of philosophy. Contact with the West, however, is bringing about revolutionary change in the Indian outlook of life. The need of a sufficient number of high quality, action-minded people is gradually dawning upon the country, for in fact the country which is fortunate in having such practical men takes up a leading position in the world.

Here is a book that offers the key to creative action, especially in the management of business. Mr. Casson brings to bear his intimate knowledge of human psychology to lay bare the methods that will greatly increase the efficiency of executives. His analysis crystallises into the slogan, 'no matter what you set out to

do, you should think first of the desired result and then create the causes to produce it.' It is the law underlying success—the law that no man can break without loss.

To attempt to make a summary of the suggestions would be impossible; we would therefore satisfy ourselves with naming the various chapters of the book, viz. (1) A definition and a Formula; (2) Action Habit of Mind; (3) Muddling and Slowing Down; (4) Creative action in Management; (5) Technique of Small Jobs; (6) Career-making Acts; (7) Action Habits; (8) Prevention of Action by Government.

Though meant for British commercial people, it will make a useful addition to the library of all commercial people in India. The ideas contained in the book should deserve most extensive application in India where there is in fact a sad dearth of practical men.

THERE'S MONEY IN A SHOP by William G. Fern, Ph. D. Published by Modern Salesmanship Ltd., 11, Upper Woburn Place, London, W.C.1. Pages 163, price 5 sh.

Mr. Fern has seen all sorts of shops in four continents—shops in Great Britain, shops in Canada, shops in South Africa and shops in New Zealand. He has therefore a wide knowledge of the methods which keep shops running smoothly and the methods which cause gradual disintegration of the whole system and lead to final stagnation.

Mr. Fern has done a significant service to the shop-keepers by making a study of the factors that reward retail selling. He leaves no aspect of the question untouched. A mention of the chapters will give an idea of the scope of the book. These are: (1) Success in a shop; (2) Right kind of shop; (3) Owner must hear; (4) Money making suggestions; (5) Salesmanship in shop; (6) Art of buying; (7) Ideas that make money; (8) Team work in a shop; (9) Winning customer co-operation; (10) Shop control and self control; (11) Art of finance; (12) How to make your shop grow.

The book is highly suggestive and is a mine of helpful ideas which are really the foundations of big business.

POLITICIANS AND THE PUBLIC SERVICE edited by A. R. Orage. Published by George Allen & Unwin Ltd., Ruskin House, 40, Museum Street, London W. C. 1. Pages 99, price 1 sh.

This book reproduces a series of articles printed in the New English Weekly about the abrupt dismissal of Hon. Violet Douglas Pentant during War time from her position as

Commandant of the Women's Royal Air Force. She was a lady of the highest ability and capacity for public work and was persuaded to give up her post as National Health Insurance Commissioner for Wales in order to become Commandant of the Women's Royal Air Force—a body, which had then been in existence for only a few months. Such was the scandalous state of affairs into which the W. R. A. F., officered by men, had fallen, with its 16,000 women scattered in men's camps all over the country, that the Air Council determined that a woman Commandant must be placed in charge to clear up the mess and to organize the Force under women officers.

Very shortly afterwards in fact almost before she had got to work,—she was removed from her post and dismissed from the W.R.A.F. To this day no reason has been adduced by Lord Weir, the then Head of the Air Ministry for this extraordinary proceeding. No judicial inquiry in the Courts of Justice has also been possible.

The book peeps into the reasons which led to her dismissal, and criticises in the name of justice the doings of each of the personages in high office who have played their part in this case as sensational as the famous Dreyfus case in France.

KNOW THY BODY—THE WONDERS WITHIN US by Medicus, M.A., B.Sc., M.B., C.M. Published by Thorsons, 91, St. Martin's Lane, London W. C. 2. Pages 188, Price 3s. 6d. net.

The human body is the chief-d'oeuvre of Creation. For intricacy of structure, for perfection of function and for durability, there is not a man-made machine of yesterday or to-day which can even approach to rivalry with it. We are all inheritors of this wonderful machine but how few of us pause to enquire of the harmonious working of the various organs in human system.

The book under review is one of the most interesting volumes we have come across with. From cover to cover the book is packed with interesting information about the marvels of the human body, the working of the brain, the laboratory of thought and feeling, circulation of blood, and about the various organs, e.g., lungs, stomach, liver, colon, kidneys, skin, nose, spines, muscles, etc. Other important chapters of the book include War Department of the Human Organism, Electrical System, Especially for Women and Mystery of Life. One enjoyable feature of the book is its style devoid of all medical technicalities. A layman without any knowledge of anatomy or physiology can go through the book without any inconvenience and

that too at a stretch. Though put in a non-technic style, the facts do not by any means lack in accuracy or up-to-date-ness.

A DIRECTORY OF INDIAN MANUFACTURERS AND HANDBOOK OF COMMERCIAL INFORMATION 1935. Published by The Maharashtra Chamber of Commerce, (Swadeshi Directory Section). Phoenix Building, Ballard Estate, Bombay. Demy Octavo size. Page 560. Price Rs. 3/- excluding postage.

We have received a copy of the Directory of Indian Manufacturers and Handbook of Commercial Information. As the name suggests the book is divided into two parts. The Directory Section contains exhaustive lists of Textile and Hosiery Mills, Sugar and Oil Mills, Soap factories, Iron foundries, Paper Mills, Glass and Ceramic (including bricks and tiles) factories, Chemical and Pharmaceutical Works, Match factories, Bakeries, Artware and Sporting goods manufacturers etc, etc. A list of Important Towns and Cities (Municipal or otherwise) and their population, Cinema Houses, Newspapers and Periodicals, Commercial Associations, Insurance Companies etc, etc, is also given.

The Volume has got a very useful commercial information section. This section gives details of the Import and Export trade of India in such commodities as Cotton, Jute, Tea, Rice, Wheat, Oilseeds, etc, etc, and a wealth of statistical information bearing on these and allied subjects. The publication should prove useful to the Manufacturer, Distributor, Exporter and Importer interested in the Indian market and Indian trade. The exhaustive index at the end will be found to be particularly useful for ready reference.

THE INSURANCE AND FINANCE YEAR BOOK & DIRECTORY 1935. Edited by Karuna Kumar Nandi. Published by Bengal Journals Ltd, 14, Clive Street, Calcutta. Pages 326 & LX, price Rs. 3.

This useful book of reference is packed with information useful to insurance officials, brokers, agents, bankers, financiers and others. It begins with a survey of the year and supplies list of Indian and non-Indian companies, summary of balance sheets and business transaction, latest valuation of companies doing business in India. Besides these facts giving comparative study of the working of the various companies the volume compiles in a convenient form much information of value to prospective customers and agents, e.g., explanation of the various insurance terms and expectation of life tables, heights and weight tables, etc. etc.

The second part of the Year Book gives a list of journals in English and vernaculars

devoted principally to insurance, insurance associations, insurance education, and a useful who's who in Indian insurance. There is a comparative premium table at the end of the book. The text of the Indian Insurance Companies Act 1912 is incorporated in the Appendix.

In these days when Indians gradually see the manifold advantages of insurance, the book should prove a variable mine of knowledge on matters pertaining to insurance. We would however, welcome in the next edition figures giving the percentage of expenses to premium realisation in the statement of accounts of the various companies and the actual money deposited by each company with the Controller of Currency.

WHAT A LIFE ASSURANCE AGENT SHOULD KNOW by Taradas Dutt, M.A., B.L. Published by M. C. Sarkar & Sons, Ltd., 15, College Square, Calcutta. Pages 110, price Re. 1-8.

Now a days the number of insurance agents is swelling up inordinately in India and specially in Bengal. There are obvious reasons for this change of outlook. On the one hand the insurance business is expanding considerably in India necessitating the employment of insurance agents to secure business for particular companies, on the other hand the high commission that the companies offer to their agents and the ease with which one can secure an insurance agency have naturally lured many an educated unemployed young man in this new line of immense possibilities.

On enquiry it will be found that many of the agents are not doing good business. India is the land where the insurance practice makes it binding upon the agents to do a lot of work, namely in seeking out persons which may be interested in insurance and convincing them by facts and arguments the advantages of having their life assured with a particular company. The task is by no means easy. One has to be acquainted with creeks and corners of insurance business, the test of this is the

to a concise but comprehensive description of different kinds of policies and bonus systems and how an agent can help in the settlement of claims. The duties and rights of the agents have been dealt with in a separate chapter. Various forms have also been added at the end of the book to enhance its usefulness, such as Proposal Form, Proof of Age, Claim Form, Assignment Form, Declaration of Good Health, etc., etc. The book can be safely recommended to the insurance agents who are sure to be benefited by a careful perusal of this book.

DIRECTORY OF PAPER MAKERS OF GREAT BRITAIN AND IRELAND FOR 1935. Published by Messrs Merchant Singer & Co., 15, Nicholas Lane, London E. C. 1. Price 5 sh. pages 300.

The Directory opens with a review of paper trade in Great Britain and Ireland during the year 1934 which shows a little improvement over the preceding year. The publisher has spared no pains in making the directory a useful guide for those engaged in paper business by including among others a list of paper mills of Great Britain and Ireland, and a list of paper makers' representatives and paper agents, a classified list of makers of different kinds of paper and a list trade designations with the addresses of the firms to whom those designations belong. Then follows information useful to paper manufacturers such as sizes of paper with a description of standard names and their sizes of paper, boards, etc. A list of dealers in rag and waste-paper and of producers of china clay has been incorporated in the book to prove it useful to paper manufacturers. At the end of the book there are appended paper Trade Customs; list of associations and other organised bodies connected with paper manufacture and trade.

THE INDIAN WHO'S WHO. By Waman P. Kabadi. Published by the author for Messrs Yeshanand & Co., Graham Bldgs., Fort, Bombay. Price Rs. 2. 0. 0.

NOTICES & REVIEWS.

[Manufacturers sending specimens and samples of their products for notice and review may please note that no notice is published of medicinal preparations and allied substances in this section.]

Litho Ink.

We are glad to receive from Messrs. A. Sher & Coy. Jullundur City, Punjab a sample cake of litho ink. The preparation is found to be satisfactory and in no way inferior to similar articles selling in the market.

Pain Balm

We have received from the Herbsalm Manufacturers, New Delhi, a sample phial of "Herbsalm Ointment" efficacious in all sorts of pains, cuts, bruises, etc. It is an excellent preparation.

Tooth Powder.

Messrs. Balatshi & Co., 14, Ramaswamy Street, Mannady, Madras have sent us several sample tins of "Damodar" tooth powder. The preparation is found to be useful for daily cleansing purpose.

Industrial Machineryes

We are glad to learn that Messrs. Bhowani Eng. & Trading Co. of 56, Gouribari Lane, Shambazar, Calcutta have recently made arrangement to sell their industrial machinery on instalment system to help and encourage small capitalists to undertake manufacturing business which is the only solution to save the country from dire unemployment.

Brass Embossed Name Plates.

We are extremely pleased with the samples of brass embossed name plates of different varieties manufactured and sent by Ray's Industries 33, Kankurgachi 2nd Lane, Office at 14/1, Old China Bazar Street; Calcutta. The articles can hardly be distinguished from the best foreign made ones, and are in no way inferior to them. We hope that our country men would do their best to patronise such meritorious works of industry.

Medical Book for Home Treatment.

We have gone through the Ayurveda "Gruha-Chikitsa" written in Bengali by Mr. Joges Chandra Ghosh, M.A., F.C.S., Prop. of Sadhana Anusadhalya, Dacca. The book deals with the principles of health and hygiene, Ayurvedic treatment of diseases, diet and anatomy, etc. It is written in such a clear and simple language that even the people with little education can use Ayurvedic medicines with the help of this book in all diseases.

Fountain Pen Ink.

We have received from The Inks Manufacturing Co. Ltd., Lucknow, U. P. sample phials of blue black "Babe" Brand fountain pen ink which is found to be quite good.

Rouge Powder & Polish

We have the pleasure to receive from Mr. M. N. Chatterjee, Simultala, Behala, (24 Parg), samples of rouge powder and polish, which are in no way inferior to similar articles selling in the market.

Medicated Toilet Soap.

We appreciate very much the sample of "Nalpamra" soap sent to us by its manufacturer, Malabar Shakti Oushadhasala, Robinson Road, Calicut. The soap gives us entire satisfaction and can compete favourably with the best brands found in the market. It is claimed to be efficacious in skin diseases of all sorts.

Toilet Preparations.

We are glad to receive from Y. D. Bordiwala, 59, Sooratee C Bazar (Top Floor), Rangoon, samples of face lotion and face powder prepared from purely Burmese herbal roots, and perfumed with indigenous essences. Both the preparations are quite satisfactory. We have also received from the same manufacturer a sample phial of eczema ointment prepared with indigenous material.

Book on Tanning

We have received from the author Mohd. Aboosaleh Nezami Madras, Tanning Demonstrator, Baroda State, Vijapur a brochure on tanning in Gujarati. This little book deals in a very comprehensive manner all processes usually followed in a tannery. The book will be found helpful to those who are actually engaged in tanning business.

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1346 G. Chennappa & Co., Gadigi Bldgs, Bellary—Can supply manganese, ruby mica, iron ore and red oxide.

1353 The Krishna Press, Mandya, Mysore State—Wants to be put in touch with the suppliers of machines for engraving on fountain pens.

1359 Paul de Lord & Co., Commercial House, Sowcarpet, Madras—Want to be put in touch with the suppliers of wet salted lizard, crocodile, python, sheep and goat skins, divi-divi, nux vomica and tanning materials.

1380 The Balance Works, Benares—Want to be put in touch with the manufacturers of brass tollah and pound weight at Delhi.

1383 H. Bros, Level Mart, Khushab, Punjab—Want to be put in touch with suppliers of flint stone.

1405 Prag Narain, Rawatpara, Agra—Wants to be put in touch with the suppliers of domestic bees and a person who can help in bee keeping.

1421 Malir Co-operative Societies, Marriot Road, Karachi—Wants to be put in touch with the suppliers of potato seeds.

1438 Sunkara Bheemayya & Sons, Nuvapada Via-Ichapur, Ganjam—Want to be put in touch with dealers in all sorts of grain as paddy, ragy, gram, etc.

1444 Prem Narain, Near Sadar Hospital, Pilibhit—Wants to be put in touch with the suppliers of spices, betelnuts, coconut, coconut oil, cardamoms, pepper, dried fruits, etc.

1451 P. Basack, 60, Hari Ghose Street, Calcutta—Wants a large supply of lotus honey.

1453 K. V. Chalapati Rao, Brodiepet, Guntur—Can supply ghee, groundnut, tobacco, chillies, pulses, rice, etc., in large quantity.

1519 Shibbu Mal Chandu Lal, Ludhiana—Can supply rotten sacks.

1537 Caledona Brush Works, 10B, Nimtalla Ghat Street, Calcutta—Want to be put in touch with the suppliers of dressed animal hair for brush makers.

1561 The Mercantile Trading & Agency Co., 808, Bhan Sadavat's Pole, Khadia, Golwad, Ahmedabad—Want to be put in touch with buyers of red, white and green clays, and rock crystal, specially of Bombay and Continental countries.

1568 Sahu Baromal Jain Rais, Najibabad, Bijnor—Wants services of soap expert.

1585 D. S. L. Rajapakse, Dahigahapitiya, Avissawella, Ceylon—Wants to be put in touch with the firms interested in Ceylon precious stone in Paris, New York, Bussels and the Hague.

SEPTEMBER ISSUE OF INDUSTRY.

(In the Press).

The September issue of Industry which will be published in the first week of the month will be a Special Number dealing with Perfumery and Toilet Industry including the Preparation of Handkerchief Essences, Snoiy Creams and Face Creams, Hair Oil, Shampoo, Lotion, etc. Besides it will contain Small Trades and Recipes; Formulas Processes and Answers; Reader's Business Problems; Brief Queries and Replies, etc., etc. Any friend of our subscribers will get a copy free as sample on application to the Manager, Industry, Shambazar, Calcutta.

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Industry

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Perfumery & Toilet Industry.

ONLY a few years ago the perfumery industry in India was centralized at certain important places where floral oils and natural ottos of the highest quality were manufactured. The common perfumery products like handkerchief essences, eau-de-cologne, pomades, creams, etc., were imported from foreign countries to meet the growing demand of the Indian population.

The outlook has undergone a thorough change since the beginning of the twentieth century. A large number of industrialists have come forward to manufacture perfumery products for the rich as well as the poor. Perfumed oils for dressing the hair and for anointing the body, perfumed toilet requisites for the face and mouth, perfumed essences for handkerchiefs, perfumed waters for baths, etc., are now-a-days being produced in the country on a wide scale.

But one great drawback in the growing perfumery industry is that the manufacturers have to depend upon foreign bases and partly manufactured foreign materials for their preparations. They simply engage themselves in procuring these articles and blending them in suitable proportions that will give a most agreeable scent appealing to the most fastidious taste.

It is now time that the perfumers do not restrict their activities to simple blending. They should now devote their energy to a careful study of a very wide subject lying unexplored before their eyes. Raw materials for manufacturing perfumery base are available in abundance in the country. It should now be the lookout of scientists, and industrialists as well, to enquire into the possibilities of manufacturing natural essential oils and perfumery bases from these ingredients. Synthetic perfumes have brought about a revolution in the perfumery trade and hence the manufacture of these products should also receive prompt attention from our industrial chemists.

In the following pages it has therefore been our purpose not only to describe the up-to-date processes of preparing various classes of perfumery but also to survey the general methods of preparing perfumery raw materials, both natural and synthetic. In fact, a really prosperous perfumery industry can be founded upon a thriving 'perfumery raw materials' industry.

PERFUMERY RAW MATERIALS.

THERE are so many hundreds of raw materials used in the manufacture of perfumed products that it is impossible to deal with them in this article in detail. In order to combine these substances so as to produce a good perfume, it is not only necessary for the perfumer to have a very considerable practical knowledge but also to possess a precise scientific knowledge of the chemical characteristics of the various constituents of the raw materials. It is a common observation that scents are considerably modified, rounded off and even spoilt when they come into combination with some special types of scented materials. The more is one's acquaintance with these facts, the greater is his chance of getting the best excellent preparations. When the perfumer is so equipped he will be in a position to guess what perfumes should be combined together and in what quantities so that when the blending is completed the preparation yields a fragrance, harmonious and free from discords. For a novice in the line it is simply impossible to say what substances are sympathetic or antipathetic towards one another and it is only experience that matters in such circumstances.

Over and above this, the perfumer should have an extremely sensitive sense of smell. The characteristic odours given out by each of these raw materials should be individually studied and known. He should be qualified to detect the several ingredients from any given perfumed preparation and point out if the blending is all that could be desired or

can be improved upon. He should also be able to find out the jarring elements in the composition.

Broadly speaking the aromatic substances can be classified under three groups:—

CLASSES OF RAW PERFUMES.

(1) Materials of purely vegetable origin.

(2) Materials of purely animal origin.

(3) Synthetic or artificial perfumes.

SOURCES OF VEGETABLE PERFUMES.

The most common example of an aromatic substance of vegetable origin is the flower which is unsurpassed in the freshness of the perfume which is said by the scientists to be due to the minute traces of essential oils present in its petals. Besides flowers, perfumes are capable of extraction from various herbs, roots, barks, leaves, stems, fruits and other parts of vegetable plants. For instance, perfumes can be obtained from the flowers of cloves, etc.; leaves and stems of patchouli, cinnamon, etc.; barks of cassia, cinnamon, etc.; woods of cedar, sandal, etc.; roots of sassafras, vetiver, etc.; rhizomes of ginger, orris, etc.; fruits of lemon etc.; seeds of bitter almonds, anise, etc.; gums or resinous exudations from myrrh, olibanum, etc., etc. Various spices also furnish a rich variety of perfume materials.

It is thus apparent that the fragrance is not confined to full-blown flowers only but may be suitably derived from all organs of the plants. Mention may also be made here that some plants also are capable of yielding more than one odour,

quite distinct and characteristic in nature. The most commonly noted example is no doubt the orange tree from which three distinct perfumes may be secured, one from the leaves, one from the fruits and one from the rind of the fruit.

ANIMAL PERFUMES.

Perfumes are also obtained from animal origin. These occur almost exclusively as glandular secretions and enter into commerce in their natural state. The chief among them are musk, ambergris, castor and civet.

Animal perfumes are specially distinguished for their property of giving permanence to the odour of other bodies with which these are mixed. The odour they possess is also characterised by wide diffusion hardly surpassed by anything else. They are held in very high esteem and are therefore liable to indiscriminate adulteration.

SYNTHETIC PERFUMES.

The evolution of the third group of perfume materials constitutes a veritable romance of organic chemical research. It has brought about a complete revolution in the industrial world. In this method the products are not directly manufactured from the odoriferous bodies but are derived by a chain of chemical processes perfected in the laboratories. The range of synthetic products at the disposal of the perfumer at the present time is extensively wide and many of the peculiar aromas characterising certain natural bodies have been, exactly or with a close approximation, reproduced in the laboratory. The underlying principle of manufacturing synthetic perfumes has also been utilised by the perfumers and

those of roses, violet, etc. have not yet been derived with any close fidelity.

Now-a-days essential oils and synthetic derivatives representing the oils are freely used as substitutes for one another. As for instance, oil of orange is a natural product while oil of neroli is prepared synthetically but they are so very identical in their constituents that they are freely interchangeable. Vanillin from pods of vanilla and artificial vanillin from eugenol are also similarly interchangeable; oil of bitter almonds with benzaldehyde; and, so on.

The synthetic products are not used alone but are suitably blended and modified by the perfumers before they reach the real consumers. They are mixed together in suitable proportions to imitate the natural perfumes of certain flowers. For example, the fragrance of the rose is not produced by a single synthetic perfume but phenylethyl alcohol mixed with geraniol, citronellol, essences extracted from various plants, and several other synthetic products yields an oil, which is a very passable imitation of otto of rose.

MANUFACTURE OF ESSENTIAL OILS.

The wide application of essential oils in the manufacture of various perfumery products prompts us to deal with their preparations with some detail

The processes are however, divided into three main classes:—

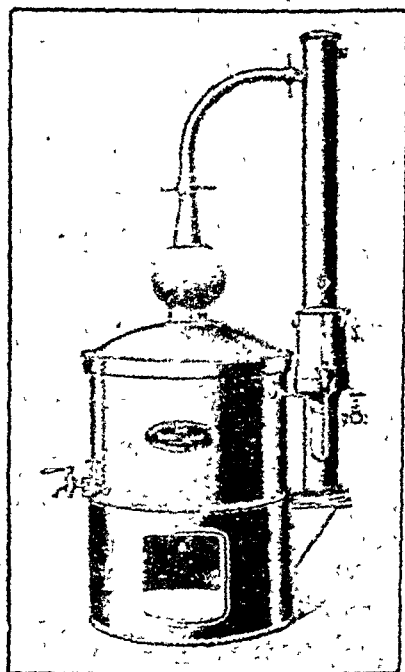
- 1 Distillation (otto of roses, sandal, geranium oils).
- 2 Expression (Orange, lemon, and limes oils).
3. Extraction (including enfleurage)

DISTILLATION.

Most essential oils are mobile odoriferous liquid which as a rule, may be distilled without undergoing decomposition.

Various methods of separating the oil are in use, the choice depending upon the nature of the oil and the quantity that can be extracted. Thus in preparing scents from flowers, the petals are heated in a still containing water, the steam carrying over the volatile oil into the condenser.

The apparatus used for distilling essential oils from various types of substances is shown at the end of this article. It consists in having a steam generator in the form of a jacket which is heated by any cheap and suitable means and which supplies steam by the side connecting tube to the still. The still is another pot with screw top and delivery tube which fits in the jacket space of the generator. There is a side tube fixed from near the top which goes down practically to the bottom and supplies the steam. The still is filled with material containing essential oils in small pieces by opening the screw top. Small amount of water is added and the apparatus is fitted as shown in the figure. When the steam passes into the bottom of the still it works on the material and while issuing out from the still it carries with it the essential oils present in the material. The warm-condenser contains a coil of tubing one end of which is connected to a pipe and the other opens out in the Florentine flask. This serves the purpose of condensing the steam and oils which collect in the flask. As the process goes on the oil forms



Still used for the Extraction of Essential oils. a layer in the flask while the lower watery portion is automatically separated by the syphon arrangement keeping the level of the liquid in the flask at a particular height and is collected in another pot. When sufficient oil has been collected the mixture is transferred to the separating funnel where all the water can be removed by the tap at the bottom, as oil being lighter remains floating on the surface of water. The oil which is thus separated can then be bottled. The arrangement of the steam generator and still is so made that there is no wastage of heat and that no water collects in the still owing to the condensation by radiation or otherwise, which usually takes place when the steam is kept outside. There is one more advantage in this process that the material is not directly heated but it is worked up by steam alone, by which better quality and

higher yield of the oil are both being secured.

Since the steam temperature is kept up by the surrounding jacket, smaller quantity of steam is necessarily required to remove the most of the oil and thus less quantity of oily water is obtained with greater quantity of oil. The capacity of the still depends upon the material being available for distillation. But the still that can hold about 5 lbs. of grass or other similar material is the most efficient. Flowers to the extent of 2 to 3 lbs. can be used only as it is necessary to add ten to fifteen pounds of water to the still with the flower before distillation. The quantity of oil that can be obtained will depend upon the quality of the material and charges taken per day. It takes about an hour or so for complete distillation of one charge from the time the steam is allowed to pass through.

The distillation of different substances, such as, Lemon grass, Rosha-grass, Khus-grass, roots, Lemon-rinds, Pudina, Sandal, Rose flower, Cinnamon Cloves, Eucalyptus, etc. has been carried out by using the above apparatus quite successfully and efficiently.

EXPRESSION.

This method is generally employed for the separation of citrus oils from the peel of the lemon, orange, bergamot, and lime. It is, however, again subdivided into three processes, namely:—

- (a) Sponge Process.
- (b) Ecuelle method.
- (c) Machine process.

Sponge Process.

The oil cells of the rind of any of the above fruits are easily broken, as can

be shown by turning a piece of lemon peel backwards. This process on a large scale, therefore, does not offer any serious difficulty, nor does it require very heavy pressure for the extraction of the oil. It may be divided into three stages: (1) the preliminary preparation of the peel; (2) the expression of the oil; (3) the clarification of the oil. The process is named according to the manner in which the preliminary operation is carried out. When the fruit is cut across the shorter axis and the pulp removed by a spoon, it is known as the *Scorzella*, and the sponges used are cup-shaped. When the rind is cut off in three strips and the pulp remains intact, it is known as the *spugna*, and the sponges are flat or nearly so. This stage of the process is comparatively light work. Before expression, the peel is either moistened with or steeped in water, which is supposed to facilitate the removal of the oil by making the cells more turgid. The drained peel is pressed and the oil so obtained is allowed to collect in a shallow earthenware bowl, the sponges used for the purpose resting on sticks attached to the edges of the receiver. The oils from the different jars are mixed and allowed to stand until any juice has separated at the bottom. It is afterwards filtered and stored in copper vessels. Any residues that may contain oil are diluted with water and the oil recovered by distillation. Such products are always of poor quality and are therefore mixed with better oils.

ECUELLE PROCESS.

The Ecuelle Method consists of rolling the fruits about in hollow vessels, the walls of which are covered with spikes.

The oil cells are punctured, and the liquid flows to the bottom, being collected in a receptacle situated in the handle of the vessel. The product is then clarified as described above.

MACHINE PROCESS.

The material is placed in a hollow iron cylinder, with sieve-like openings in its circumference. The ram of a hydraulic press enters the cylinder and compresses the material. The fluids escape through the perforations, and the residue forms a compact woody cake, which is then freed from oil by steam distillation or extraction by solvents. The mixture of oil and water which escapes is allowed to settle, and the water decanted from the oil in a separating vessel.

EXTRACTION.

The extraction process is again subdivided into two parts, viz.—

1. Extraction by means of non-volatile or fixed solvents such as animal fats or vegetable oils.

(a) At normal temperatures—
Enfleurage.

(b) With the application of heat—
Maceration.

2. Extraction with Volatile Solvents such as petroleum ether, etc.

The choice of process depends upon several factors, the more important being:—

(a) That certain varieties of flowers produce fragrant materials when placed in such a condition that their vital functions may still be exercised.

(b) That other varieties of flowers contain all their odoriferous principles in the free state, and are unable to produce new fragrant materials, even if still fresh.

Among the former class may be included jasmine and tuberose, while typical examples of the latter are rose and orange flower. The process which is best applied to the extraction of the odoriferous bodies from any particular flower has been determined by many years of experience in the South of France.

Enfleurage is applied to jasmine, tuberose, jonquille, muguet, etc.

Maceration gives better results with cassie, rose, orange blossom, violet, etc.

Volatile Solvents are used for extracting, rose, jasmine, jonquille, tuberose, violets, cassie, orange flowers, heliotrope, etc.

ENFLEURAGE.

Enfleurage is applied to those flowers which, even after removal from the stem, continue to produce perfume materials, and the process depends upon the capability of greases and fixed oils to absorb and retain these aromatic bodies when placed in contact with the flowers. It is applied, as stated above, to jasmine, jonquille, lily of the valley, muguet, and tuberose.



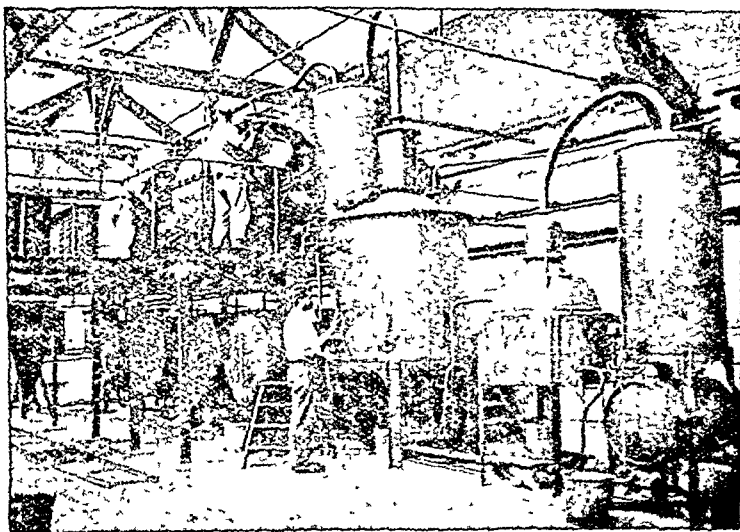
Enfleurage—placing the Blossoms on the Chassis.

In this method the fat is spread to a thickness of about $\frac{1}{4}$ inch, on glass plates arranged in tiers one above the other. Flowers are sprinkled on the plates and left for one to three days. When these are exhausted fresh flowers are added. The process is repeated until the fat on the plates has absorbed sufficient scent to make up strong pomade.

MACERATION.

Maceration consists in the extraction of the flowers by immersion in liquid fats or oils at a temperature of about 60° to 70°C. The greases or oils mentioned under enfleurage are used for this purpose, but paraffin appears to find less employment than the others on account of its lower absorption capacity. The flowers treated by this process (cassie, rose, orange, violet, narcissus, muguet, etc.) are mixed with the hot greases in pans and the whole of the contents stirred. The cells containing the essential oil are ruptured by the heat, and the aromatic constituent absorbed by the fat. When exhaustion is complete the contents of the pan are ejected on to a huge perforated screen and allowed to drain. The fat is collected and further quantities of flowers are mixed with it, the process being repeated until the extraction media is thoroughly saturated—the exact weight of flowers for the comple-

tion of this process having been arrived at by years of experience. The exhausted flowers left on the screen still contain quantities of perfumed grease. The perfume in the grease can be extracted and utilised as required. For this purpose they are placed in linen bags and submitted to hydraulic pressure for its recovery.



Extraction with Volatile Solvents.

EXTRACTION WITH VOLATILE SOLVENTS.

An extraction method with a volatile solvent such as alcohol, or with olive oil or lard, is used in the preparation of delicate scents, the essential oils being subsequently separated from the extracts.

A typical modern extraction plant is shown in the figure. The volatile solvent (alcohol, ether, benzine, or carbon disulphide) is raised by the pump into the collector furnished with a glass gauge tube to note the volume of the contained liquid. The basket filled with plants, is lowered by means of a tackle into the extractor, which is then closed. Next the

solvent is run into the heater containing a steam worm, and is thence sent into the extractor, either from above or from below, and comes out again by other pipes, after which it goes into the evaporator. Here a heating coil vaporises the solvent, which passes as a vapour into the condenser and thence into the collector where it re-enters into circulation leaving the perfume behind. Finally the solvent is distilled off from the exhausted flowers. If alcohol is used as a solvent it soon becomes diluted with the moisture contained in the flowers. Consequently the alcohol is distilled away through a rectifier which only allows a sufficiently alcoholic distillate to pass. This is condensed and collected and used again; after this the extractor is opened and the basket withdrawn and replaced by a basket filled with fresh flowers.

FLORAL OTTOS.

The fundamental principle underlying the preparation of floral ottos is similar in every case while the basis of all of them is the same. Freshly bloomed flowers before their full expansion are stalked, removing the green clayxes and are gently freed from dirt and dust without injuring the petals. Care should be exercised in this respect, otherwise the otto will be contaminated. They are steeped in water or sandal oil, heated on the water bath or warmed by the sun and finally filtered through a funnel. The filtered otto is collected in a stoppered phial and placed in the sun for a number of days to clarify. A sediment is allowed to form at the bottom so that the supernatant liquid gets thin, limpid and clear.

ROSE WATER, ETC.

Toilet waters like rosewater are in

big demand in the country. Process of manufacturing rose water has appeared more than once in these columns and need not be repeated here.

NATURAL ESSENCES.

The manufacture of essences is comparatively an easy task and does not involve complicated processes. Only what is required of the manufacturer is clean and careful manipulation. The object in view should be to arrive at a preparation, the odour of which is pleasant and persists for a pretty long time and which does not leave any residue on evaporation.

MODE OF PREPARATION.

To attain this end, most scrupulous attention should be attached to the selection of the constituents which enter into the composition of essences. The principal of these are alcohol and the essential oils. The alcohol used should be of the best quality available and rectified, if possible. Crude alcohol invariably contains a lot of impurities and its use as basis spoils the whole preparation.

The essential oils can often be replaced by the odoriferous bodies yielding the perfumes themselves. The raw odoriferous bodies are infused in rectified spirit. On prolonged maceration, the period depending upon the nature of the body and the easiness with which it yields up its perfumes, the essences are obtained. These essences generally go by the name of natural essences. But their manufacture is rather restricted and the majority of essences met with in the market is derived from artificial sources and are made from the essential oils. Of course, the concentrated forms of natural essences can be preserved and

may be diluted with spirit either alone or in combination with others to give the most delicate preparations.

NATURAL ESSENCES.

The chief application of floral extracts lies in the preparation handkerchief perfumes, scents, essences, etc. The process of preparation is essentially the same in every case.

A few examples of natural essences follow:

ROSE.

Procure 16 oz. dried buds of Rose (any scented variety) and 20 oz. spirit of wine. Put the two together into a wide-mouthed stoppered phial for 20 days. Filter and store in a stoppered phial.

BAKUL.

Take Bakul flowers 8 oz., clean and free from dust; put them in a stoppered phial and pour in 20 oz. Cologne spirit. Close the mouth. Leave aside for 3 days; and filter. Again soak 12 oz. fresh flowers in the filtered spirit and leave aside undisturbed for 48 hours. Finally filter and put in a stoppered phial.

HENA.

Mehndi flowers 8 oz.; proof spirit 16 oz. Put these two ingredients together in a stoppered phial for 15 days. Wring out the flowers and throw them away. Put 12 oz. fresh flowers in this spirit and filter after 7 days. Store in a stoppered bottle.

GANDHARAJ.

Take 200 Gandharaj flowers free from stalks and 32 oz. spirit of wine. Put the two together into a stoppered phial for 3 days and then wring out the flowers. Put in 200 fresh flowers and leave for 48 hours. Wring out the flowers; put in a third lot of 100 flowers and set aside for 24 hours. Finally filter

BELA.

Take 16 oz. Bela flowers free from stalks and 20 oz. Cologne spirit. Put these two ingredients in a wide-mouthed stoppered phial for 48 hours. Wring out the flowers and put in 8 oz. fresh flowers. Set aside for 24 hours and then filter through filter paper. Store carefully in a stoppered phial.

BERGAMOT.

Oil of Bergamot 4 oz. and spirit of wine 30 oz. are taken in a stoppered bottle and kept for 7 days. After the laps of allotted time, filter and then pack.

CHAMELI.

Take 12 oz. Chameli flowers free from stalks, put in a wide-mouthed stoppered phial and pour in 16 oz. Cologne spirit. Leave for 48 hours, strain and throw away the flowers. Put in 8 oz. fresh flowers, leave for 24 hours, then filter and store in a stoppered phial.

FILTERING.

The preparation should always be filtered before final packing. Turbid and unclean preparations do not command respect. The solutions should be perfectly clear and transparent. Ordinarily it will be found that the filtered solutions often cause deposits to form at the bottom of the container on long standing. Hence the essences as a general rule are allowed to stand for a few weeks and then filtered so that no residue can form later on.

SYNTHETIC PERFUMES.

Synthetic perfumes are generally sold in the market as raw materials which require careful blending by the perfumer to produce a good and useful perfume. Associated with natural perfumes of vegetable or animal origin, they enter

1. DERIVATIVES OF BENZINE.

Reactions	}	—Acetophenone—ortho-Anisidine—	—Guaiacol—Vanillin.
Acetylchloride and Aluminium chloride			
	}	—Phenyl ethyl alcohol.	
By			Bromine Magnesium Phenyl-bromo-lactic acid
Sulphonation	}	—Phenol—Salicylic acid—	{ Methyl Salicylate, iso-Butyl Salicylate, Amyl salicylate, Benzyl salicylate.
Alkaline fusion			

2. DERIVATIVES OF TOLUENE.

By Chlorination	{	Benzyl alcohol—Benzylesters.	
		Benzoic aldehyde—	{ Cinnamic aldehyde, Cinnamic esters, Cinnamic acid, Brontostyrolene Methyl anthranilate.
Benzyl chloride	{	Benzoic acid—Benzoic esters.	
		Phenylacetic aldehyde	
		Phenylacetic acid—Phenyl acetic esters.	
		Diphenylmethane—Phenyl ethyl alcohol.	
		Acetyl chloride and Aluminium chloride	} —Methylacetophenone.

3. DERIVATIVES OF META-XYLENE.

iso-Butyl alcohol	}	—Xylene musk.
Aluminium chloride		
Nitric acid		
iso-Butyl alcohol	}	—Ketone musk.
Aluminium chloride		
Acetyl chloride		
Nitric acid		

4. NAPHTHALENE DERIVATIVES.

By Sulphonation and Alkaline fusion	Beta-Naphthol—	{	Methyl ether
			Ethyl ether
Sulphuric anhydride—	Phthalic acid—	{	Anthranilic acid.
			Indol.
			Methyl Anthranilate.

5 CRESOL DRIVATIVES.

Ortho-Cresol—	Coumarine.	
Meta-Cresol—	Musk amberette.	
Para-Cresol—	Methyl Para-cresol—	{ Anisic aldehyde
Ethyl para cresol—	Anisic esters.	

6, DERIVATIVES OF VEGETABLE ESSENTIAL OILS.

Turpentine—	Camphor, Terpeneol and its esters.
Lemon-grass oil—	Citral, Ionone and its esters.
Ceylon Citronella oil—	Geraniol and its esters.
Java Citronella oil—	Geraniol and Citronellal.
Geranium oil—	Rhodinol.
Palmarosa oil—	Geraniol and its esters.
Camphor oil—	Safrol, isosafrol, Heliotropine.
Aniseed Oil—	Anethol.
Clove oil—	Eugenol, iso Eugenol, Vanillion.
Rosewood oil	{ —Linalol and its esters.
Linaloeoil	
Styrax—	Cinnamic alcohol.

TABLE OF PRINCIPAL ARTIFICIAL
PERFUME & ISOLATES.

Substances.	Odour.
Amylacetate	Acacia.
Bornyl acetate	Jasmine.
Geranylacetate	Wild rose.
Linalyl acetate	Bergamot.
Benzyl alcohol	Slight Jasmine.
Phenylethyl alcohol	Rose.
Benzoic aldehyde	Bitter almonds.
Cinnamic aldehyde	Cassia, Cinnamon.
Citral	Lemongrass, verbenia.
Citronellal	Citronella grass.
Citroncilol	Rose.
Ethylanthranillate	Neroli.
Eugenol	Cloves
Florentinol	Orris.
Giraneol	Rose.
Geranyl formate	Rose-geranium.
Heliotropin	Heliotrope.
Ionone	Violet.
Irone	Orris.
Iacinth	Hyacinth.
Jasminol	Jasmine.
Lavandol	Lavender.
Methyl salicylate	Winter green.
Muguet	Lily of the valley.
Terpineol	Lilac, lily.
Tonquinol	Tonquin bean, musk.
Vanillin	Vanilla.
Yara-yara	Neroh.
Zibethine	Civet.

BLENDING.

With the coming of the synthetics the perfumer has had a new set of difficult problems to solve. The flower perfumes are themselves nicely blended by nature to produce desirable odours, the varying notes being delicately harmonized. The perfumes therefore, in using these has merely to mix them in easily ascertainable proportion and can hardly fail to produce a reasonably pleasing odour. This is far from true of the synthetics, each of which, assuming the impossible case that they are absolutely pure, represents but a single note in the scale of odour harmony. The blending of these, to produce a delightful composition is a task of real magnitude. At best it is practically impossible to duplicate with exactitude the fine delicacy of the flower perfumes and it is for this reason that the synthetics can never entirely replace the natural perfumes, whatever their advantage in the direction of economy.

PERFUMERY ARTICLES.

FIXATIVES AND MODIFIERS.

IN preparing perfumery articles a number of raw materials, besides raw perfumery bases, are required.

FIXATIVES.

The raw materials for the perfumery industry may be classified under three groups: the distinctive odours, the modifiers and the fixers. The distinctive odours most relished are those of rose-mary, patchouli, bergamot, ylang ylang, musk, lily of the valley, heliotrope, narcissus, geranium, hyacinth, benzoin, etc., etc. But sometimes these fail to appeal properly to the sense of smell. They are, in such cases, combined with modifiers which mellow, soften down or temper, as it is called, the smell of the distinctive odour. Thirdly, the essential oils used in combination to secure the harmonious blend of any perfumery preparation possess unequal rates of evaporation, i.e., some of them are more volatile than the rest. Hence the need of adding some agents which would prevent the unequal evaporation of the individual perfumes, render the odour persistent by reducing the rate of evaporation and at the same time maintain the predominant note of their fragrance. These agents are known as fixers or fixative agents or binders.

The group of bodies from which suitable fixatives for any perfume can be selected is a large one. Various perfume materials known as tinctures or extracts are added as fixatives, some of which are pleasantly aromatic, some disagreeable and some others neutral. The principal of these are benzoin, peru balsam, tolu balsam, storax, myrrh, patchouli, khus,

sandalwood, musk, ambergris, benzyl iso-eugenol, vanillin, coumarin, heliotropin, asafoetida, valeriana, civet, castor, indol, benzyl benzoate, ethyl phythalate and glyceryl acetate.

ALCOHOL.

Another commodity which largely enters into the composition of essences, ottos, essential oils, aromatic waters, etc. is alcohol which is variously known as spirit, rectified spirit, absolute alcohol, spirit of wine, according to the purity of the stuff. The ardent spirits which are obtained by distilling fermented liquors consist mainly of three ingredients, alcohol, water and a little oil or resin, to which they owe their flavour and colour. When these liquids are redistilled the first portion that comes over is a fine light, transparent fluid, known in commerce by the name of rectified spirit. When as highly rectified as possible, the specific gravity of the liquid obtained does not appear to be less than 0.8200 and is generally more. Alcohol cannot, by this process, be deprived of the whole of the water with which it is combined; but by redistillation with hot hydrochlorate of lime, it is procured of the specific gravity of 0.738 at 60°F. In this state it is the strongest that can be procured; and it is therefore called pure or absolute alcohol. The alcohol of commerce, or spirit of wine is never so strong as this: its specific gravity is seldom under 0.8370. In this state it is fragrant, limpid, colourless, volatile, inflammable, and of a pungent, agreeable taste. It combines with water in every degree; and the proportion of it present in common spirits can

be best judged by their specific gravity. The specific gravity of pure alcohol being 0.7939 at 60°F and that of water 1.000, it follows, that the lighter a spirit is, the stronger it is. Proof spirit is a mixture of equal bulks of alcohol and water. When spirits are weaker than this they are said to be underproof; when stronger, to be aboveproof: thus, "10 underproof" signifies that every 100 gallons of that spirit would require to have 10 gallons of water abstracted from it to bring it up to proof; and "10 overproof" means that every 100 gallons contains too little water by 10 gallons.

DEODORISED ALCOHOL

Grain spirit, specially rectified, should be used in compounding perfumes, since ordinary alcohol is not satisfactory for perfumes; it is too immatured. However it can be treated as follows to give something satisfactory:—

Alcohol	1 gall.
Powdered slaked lime	4 dr.
Powdered alum	2 dr.
Spirit of nitrous ether	1 dr.

Mix the lime and alum and add them to the alcohol shaking the mixture well together; then add the spirit of nitrous ether and set aside for some days, shaking occasionally; finally filter.

OTHER SUBSTANCES.

Besides these odorous raw materials the manufacturer makes use of a number of other substances such as water, alcohol, vegetable oils, fats, etc., etc.



Machine for the production of Face Powders.

ARTIFICIAL ESSENCES.

The preparation of simple essences consists primarily in mixing some Heiko perfume, such as Heiko bela, Heiko rose, Heiko patchouli, Heiko jasmine, Heiko musk, Heiko chameli, etc. in rectified spirit 60 over-proof. The whole is allowed to mature for a fortnight or more, during which period the containing bottle is shaken three times daily for 15 minutes every time. The usual proportion is 1 oz. of the Heiko scent in 48 oz. of the spirit. Sometimes a small quantity of musk, essence of musk or essence of ambergris is added to render the perfume more persistent. The perfumes may be packed in tubes.

SIMPLE ESSENCES.

The few recipes given below offer the clue to the manufacture of many others of similar type.

(1) Heiko Lily, 1 oz.; Essence Amber, 2 oz.; Spirit 48 oz.

(2) Heiko Tuberoso, 1 oz.; Essence Ambergris, 1 oz.; Spirit 48 oz.

(3) Heiko Lily of the Valley, 4 dr.; Essence Musk, 1 oz.; Spirit, 24 oz.

(4) Heiko White Rose, 4 dr.; Musk, 2 dr.; Spirit 24 oz.

Simple essences are also prepared by dissolving country made ottos in spirit with the addition of benzoic acid. The mode of preparation is exactly the same, only the time of maturing is lengthened to one month. A few typical recipes follow.—

(1) Otto of Jasmine or Santal, $1\frac{1}{2}$ tollahs; Spirit, 24 oz.; Benzoic Acid, 15 gr.

(2) Otto of Hena or Bakul, 2 tollahs; Spirit, 24 oz.; Benzoic Acid, 15 gr.

(3) Oil of Chameli Flowers, 1 tollah; Benzoic Acid, 8 gr.; Musk 2 gr.; Spirit, 16 oz.

COMPOUND ESSENCES.

The preparation of compound essences taxes the best skill of the perfumers. As already remarked much would depend upon perfect manipulations. For marketing, pack them in decent phials with glass stoppers. One good formula is given below:—

Essence Amber	2 dr.
" Orange	1 dr.
" Vanilla Bean	4 dr.
" Ylang Ylang	4 dr.
" Jasmine	3 dr.
" Rose	8 dr.
" Sandal	2 dr.

Otto Neroli	1 dr.
Otto Bergamot	2 dr.
" Musk	30 minims.
Rectified Spirit	2 bottles.

Add the ingredients one by one in a big vessel and have them thoroughly mixed together with shaking. Put the whole air-tight in a stoppered vessel for a fortnight during which period shake it thrice daily for 15 minutes at a time. Finally filter. The aroma of this preparation is very delightful and lasting.

HANDKERCHIEF PERFUMES.

The introduction of synthetic perfumes has enlarged the range of possibilities in handkerchief perfume production, but the best perfumes still owe their favour and stability to the floral pomades.

BRIDAL BOUQUET.

Oil of sandalwood	$\frac{1}{2}$ dr.
Rose extract	4 oz.
Jasmine extract	4 oz.
Orange flower extract	16 oz.
Essence of vanilla	1 oz.
Essence of musk	2 oz.
Tincture of storax	2 oz.

ESSENCE BOUQUET.

Oil of neroli	15 mins.
Oil of lemon	1 dram.
Oil of bergamot	$\frac{1}{2}$ dr.
Cassie extract	1 oz.
Essence of ambergris	1 oz.
Tincture of orris	1 oz.
Spirit of rose	8 oz.
Alcohol	5 oz.

CHYPRE.

Oil of rosemary	100 mins.
Oil of bitter orange	$\frac{1}{2}$ oz.
Oil of petitgrain	2 dr.
Oil of bergamot	$2\frac{1}{2}$ dr.
Oil of neroli	45 mins.
Alcohol	80 oz.

Mix, and after 4 days add 10 oz. of distilled water. Allow to stand for a fortnight and filter.

HYACINTH.

I.

Hyacinthin	1 dr.
Oil of neroli	10 drops.
Essence of musk	50 drops.
Tincture benzoin	100 drops.
Jasmine extract	10 dr.
Orange flower water	5 dr.
Alcohol to make	10 oz.

II.

Heliotropine	15 grains.
Coumarin	8 "
Oil of neroli	2 dr.
Oil of geranium	2½ "
Essential oil of almond	5 drops.
Jasmine extract	10 oz.
Alcohol	30 "

III.

Heliotropin	60 grams.
Terpineol	50 "
Bergamot oil	30 "
Phenylacetaldehyde	24 "
Syn. Musk	5 "
Cananga oil	5 "
Alcohol	10 litre.

ORIENTAL BOUQUET.

Oil of lavender	100 drops.
Otto of rose	1 dr.
Jasmine extract	2½ oz.
Essence of vanilla	2½ "
Alcohol to produce	40 "

LILAC.

Terpineol	2 fl. oz.
Vanillin	40 grains.
Syn. Jasmine otto	2 fl. drs.
Geraniol	32 mins.
Palmarosa oil	32 "
Bergamot oil	60 "
Rectified spirit	1 gallon

HELIOTROPE.

Heliotropin	160 grains.
Vanillin	24 "
Coumarin	16 "
Essence of Musk	160 mins.
Syn. ylang ylang oil	60 "
Geraniol	32 "
Benzaldehyde	8 "
Rectified Spirit	1 gall.

FACE POWDERS.

Face powders are now recognised as one of the most indispensable toilet articles. They act partly as an absorbent and partly as a protection of the skin, preventing in a measure chapping or roughness. They exercise a peculiar beautifying effect on the skin, causing the removal or disappearance of blemishes by absorption or otherwise.

A good face powder must possess some characteristic properties influenced by the following considerations:—

(1) The powder must have good covering power and so hide slight skin blemishes.

(2) It must adhere perfectly to the skin and not blow off easily.

(3) It must not completely be dissipated in a few minutes and so make repowdering continually necessary.

(4) There must be sufficient slip to enable the powder to be spread on the skin by the puff without producing a blotting effect.

PERFUMES.

A face powder will never achieve large sales unless the odour is pleasing. This must not be thin, that is to say, the odour must be round and have body, and yet possess an elusive flowery freshness. It must be sweet and delicate and in no case be strong and pungent.

From maker's point of view the perfume should be complex, and thus difficult to duplicate.

CHOICE OF COLOURS.

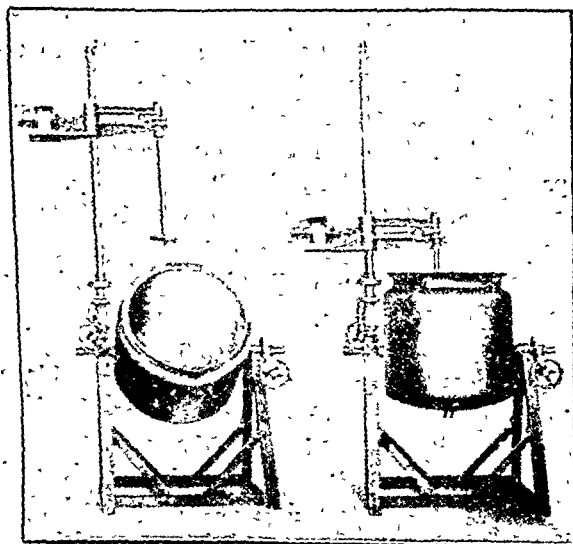
The colouring of a face powder requires an artist's eye—the shade must be bright and alive, yet delicate. The colours are seldom arrived at as a matter of luck; they generally take hours of experiment with numerous shades of a given colour. A very large number of raw materials are now available and may be grouped as under:—

(1) Vegetable origin—Burnt sugar, alkanet, saffron, turmeric.

(2) Pigments—The brown, yellow, and red oxides of iron.

(3) Dyestuffs—The halogen derivatives of fluorescein and their potash salts, rhodamines, auramines, chrysoidines, and phenylene browns.

(4) Lakes—Carmine and various dye-stuffs struck on chalk, barytes, and other non-poisonous bases.



Jacketed Pan for Cream manufacture.

KINDS OF FACE POWDERS.

Face powders as a class are divided into three kinds, depending largely upon the substances from which they are made.

The first kind contains a large proportion of starch; the second variety contains mineral powders, while the third type is the mixture of the other two types judiciously combined.

The substances from which these varieties may be made are:—

Rice and maize starches, bismuth subnitrate and oxychloride; stearates of zinc and magnesium, talcum, kaolin, kieselguhr, chalk, zinc oxide, light magnesium carbonate, orris-root powder, barium sulphate.

PROCESS OF MANUFACTURE.

In manufacturing face powders the materials should be ground to a very fine state of sub-division and then putting them through sieve of at least 100 mesh. For perfect results 120 is recommended, the whole operation is easily accomplished

with a modern sifting and mixing apparatus as shown in the diagram on page 365.

After grinding and sifting, the ingredients are taken in specified proportion and a small quantity of such a mixture is put in a mortar and then rubbed with suitable colour and then mixed with the whole lot and sifted twice to make sure that sub-division of the basic pigments has been accomplished.

Perfumes are next added by spraying the liquid perfumes on to the powder as it falls through the silk sifter. The amount of perfume used should be reduced to a minimum.

Here are some formulas of all the three kinds of powder:—

I.

Rice starch	600	grams.
Maize starch	200	"
Talcum	100	"
Zinc stearate	50	"
Zinc oxide	50	"

Mix. This is an example of first type.

II.

Talcum	400	grams.
Precipitated chalk	300	"
Zinc oxide	100	"
Barium sulphate	100	"
Orris root powder	100	"
Perfume		q.s.

Mix. This recipe belongs to second kind.

III.

Rice starch	400	grams.
Zinc oxide	400	"
French chalk	100	"
Magnesium stearate	100	"
Perfume as desired		

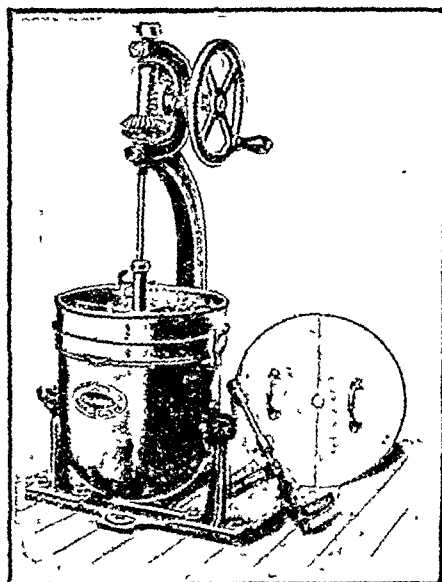
IV.

Rice starch	300	grams.
Maize starch	200	"
Kaolin	100	"
Talc	100	"
Zinc oxide	200	"
Calcium carbonate	100	"
Orange chrome	5	"
Heliotropine	5	grms.
Bergamot Oil	2	c.c.
Ionone alpha	2	"
Ylang-ylang oil	1	"
Sandalwood oil	1	"

This will make a pleasantly perfumed powder of violet odour.

TALCUM POWDERS.

Talcum powder is a toilet article having a very wide sale. It is milky



Typical Machine for Cream Manufacture.

white producing lustre to the skin. A few recipes follow:—

Talc	900	grams.
Zinc stearate	25	"
Magnesium carbonate (light)	75	"
Rose absolute	2	c.c.
Isobutylphenylacetate	1	"
Citronellol	1	"
Palmarosa oil	1	"
Benzoin R	2	"

II.

Talc	800	grams.
Boric acid	100	"
Zinc stearate	20	"
Magnesium carbonate (light)	80	"
Ionone beta	1	c.c.
Heliotropin	1	gm.
Orris oil—liquid	0.5	c.c.
Violettohyx	2.5	c.c.
Ethyl myristinate	.1	"
	3	

VIOLET POWDER.

Corn starch	200	grams.
Orris root powder	750	"
Zinc stearate	20	"
Fuller's earth powder	30	"
Violet synthetic	2	c.c.

HAIR OILS.

Hair oils and pomades as hair dressing are very popular among Indians. They use these preparations every day before or after bath. These not only nourish their sculp but also make the hair roots strong and assist in their growth.

Hair oils generally consist of benzoated oil to which any desired floral odour has been incorporated. Benzoated oil is made by digesting an ounce of bruised benzoin in a pint of almond or olive oil for three hours on a water bath, and filtering through filter paper. Oil so prepared does not become rancid.

H. Fouquet gives the following method for the preparation of benzoated oil:—

Heat on a water bath 1000 grams of vegetable oil and add 100 grams of powdered sodium bicarbonate to the hot oil with agitation. When solution is effected, 100 grams of benzoin enclosed in a cheese cloth bag, is suspended in the oil, or, in the place of benzoin, dissolve 100 grams of benzoic acid in the oil. For use as a base for hair oils, 50 grams of this concentrated benzoated oil is mixed with 1000 grams of vegetable oil and 5 grams of terpineol added to the mixture, to mark the oily odour.

I.

Benzoated oil	20	oz.
Otto of rose	20	mins.
Oil of rose-geranium	10	mins.

II.

Benzoated oil	10	oz.
Ionone, 100 %.	2½	oz.
Otto of rose	2	mins.
Oil of jasmine, syn.	3	"
Oil of cloves	6	"
Oil of bergamot	12	"

Mix. For other odours mix 1 part of any floral oil with 4 parts of benzoated oil.

III.

Benzoated oil	10	oz.
Jasmine oil (floral)	10	dr.
Oil of clove	10	drops.
Oil of bergamot	½	dr.
Otto of rose	5	drops.
Oil of orange flower	20	drops.
Oil of thyme	1	drop.

IV.

Castor oil	16	oz.
Rectified spirit	3	oz.
Oil of nutmeg	30	drops.
Oil of rosemary	10	"
Oil of neroli	10	"
Otto of rose	20	"
Essence of musk	1	dr.
Alkanet root to colour	q. s.	

This is said to be a recipe for Macassar oil.

V.

Refined castor oil	24	oz.
Heiko narcissus	2	dr.
Flora jasmine	2	dr.
Alkanet root	2	dr.

Allow the root to soak in the oil, which has been properly refined for seven days, after which filter and mix the perfumes.

VI.

Refined castor oil	12	oz.
" Til oil	12	oz.

Alkanet root	2 dr.
Oil of lavender	2 dr.
Oil of rose geranium	1 dr.
Oil of cinnamon	$\frac{1}{2}$ dr.
Oil of cloves	$\frac{1}{2}$ dr.
Heiko pitunia	2 dr.

First mix the castor oil with the til oil and add the root in the mixture. Put the whole in the sun for a week in a well-covered glass vessel or china jar. Then filter and add the essential oils one by one.

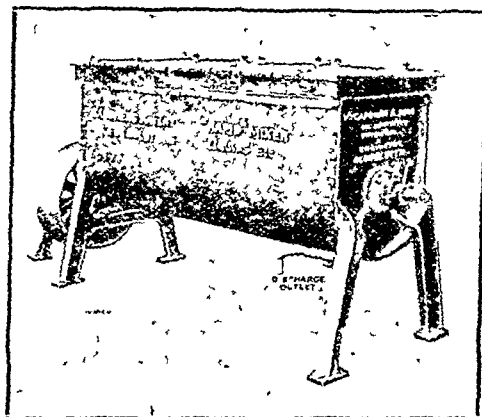
VII.

Refined coconut or sesame oil	20 lbs.
Balsam Peru	5 oz.
Fly cantharides	$1\frac{1}{4}$ oz.
Sandal oil	3 oz.
Alkanet root	3 oz.
Oil of hena	$1\frac{1}{4}$ oz.
Oil of rosemary	$2\frac{1}{2}$ oz.

Treat the oil with alkanet root and allow to remain undisturbed for 2 days for colouring. Then filter through fine cloth. Then take an ounce of the coconut or sesame oil and fry the cantharides. Now allow the oil to cool and afterwards add to the coloured oil. Next add the balsam Peru after melting it over a slow fire. Finally add the other ingredients one by one with constant shaking.

VIII.

Refined sesame oil	3 lbs.
Alkanet root	$\frac{1}{4}$ oz.
Oil of bergamot	$1\frac{1}{2}$ oz.
Oil of lemon	6 dr.
Oil of rosemary	4 dr.
Oil of neroli	2 dr.
Oil of lavender	4 dr.
Oil of orange	2 dr.
Oil of rose geranium	4 dr.



Type of Machine used in the preparation of Lotions.

Cantharidin	3 grains.
Balsam Peru	4 "

Take the oil and put into it the alkanet root cut into small pieces. Allow the whole to stand for 2 days and filter through a piece of fine cloth. Next add the other ingredients one after another in the order they appear in the recipe and shake the whole for 10 minutes after each addition. Balsam peru is the last ingredient and to be melted over a slow fire before incorporation. When the ingredients are all incorporated, the whole is kept aside air-tight in a vessel for a fortnight.

POMADES.

Pomade for hair is another popular toilet article. It is largely used by the fair sex. It is apt to go rancid and in order to prevent this the fats, before perfuming, are benzoated by digestion with benzoïn, or for preference by dissolving a small quantity of benzoic acid in the melted greases.

POMADE PERFUMES.

The quantity and quality of the perfume used in pomade is not very impor-

tant. The oils of bergamot, neroli, petit-grain, verbenia, lemon-grass, citronella, and clove are in commonly use, while the synthetics employed include terpeneol, dimethyl hydroquinone, coumarin, methyl acetophenone, etc.

PROCESS.

The mode of preparation of pomades is very simple: The fats are melted and benzoinated. They are then strained through a piece of lint or linen to remove extraneous matter. After cooling, the perfume is added, and they are then filled in pots. It is important that the temperature should not be high, or else the fats will contract on solidification, and come away from the sides of the jar.

I.

Tegin	8 parts by weight.
Liquid paraffin	20 " "
Arachis oil (or soya been oil)	2 " "
Distilled water	70 " "
Perfume	q. s.

Mix the tegin, arachis oil and liquid paraffin over water bath. While still warm, run in the water, previously warmed. Stir vigorously until quite homogeneous and cool.

II.

Spermaceti	2 oz.
Castor oil	4 oz.
Alcohol	4 oz.
Oil of bergamot	1 dr.
Oil of neroli	30 mins.
Oil of cloves	10 mins.

Melt the spermaceti, add the castor oil and then the alcohol in which the essential oils have been previously dissolved. Fill in pots and allow to cool without stirring.

III.

Spermaceti	1 oz.
Petrolatum	4 oz.
Castor oil	4 oz.
Oil of cassia	30 mins.
Oil of cloves	10 mins.
Oil of bergamot	1 dr.

Melt the spermaceti, add the oils and allow to cool without stirring.

IV.

Pilocarpin hydrochlorate	10 grains.
Balsam Peru	30 grains.
Precipitated sulphur	1 dr.
Benzoated lard	1 oz.

Dissolve the pilocarpin in a few drops of water and mix in a mortar with the other ingredients.

CREAMS & LOTIONS.

The use of perfumed articles has grown steadily with the advances of civilisation. To-day the demand for creams and lotions has assumed a vast proportion for preserving and beautifying the skins. These creams are sold in various names such as cold cream, vanishing cream, etc. each possesses a definite property.

COLD CREAM.

This type of cream is an emulsion in which the fat predominates but the cooling effect produced when it is applied to the skin is due to the slow evaporation of water. The method of manufacture is simple consisting of melting the wax on a water-bath, adding the oil, and warming the whole to 80°C. The aqueous portion containing borax is sometimes heated to this temperature and stirred in slowly. The perfume is added when cool. When borax is not used the

cream should be stirred vigorously for a prolonged period to obtain a good emulsion.

Perfume is a most important consideration in the preparation of toilet requisite, and the best creams are always highly fragrant. Excellent results may be obtained with bodies such as the following: ambers, artificial musks patchouli, vetivert, ylang-ylang, and lavender oils, terpineol, linalol, methyl acetophenone, ethyl cinnamate, and dimethyl hydroquinone. The resinoids are also good and should not be overlooked.

A few recipes follow:—

I.

Almond oil	550 c.c.
White wax	150 grams.
Borax	10 „
Water	190 c.c.

II.

White soft paraffin	12 grams.
White beeswax	12 „
Almond oil	50 c.c.
Borax	1 gram.
Rose oil	q.s.

Melt the wax in the oil, and dissolve the borax in the rose water by the aid of gentle heat. When both solutions are at the same temperature, add the aqueous liquids gradually to the wax and oil and stir until the mixture stiffens. Pour into a slightly warm mortar containing soft paraffin, stirring until mixed; then add the perfume and again stir till cold.

III.

White wax	6 dr.
Spermaceti	$\frac{1}{2}$ oz.
Almond oil	8 oz.
Distilled water	4 oz.

Borax	1 dr.
Oil of rose	10 mins.
Oil of bergamot	20 mins.

Melt the fats, etc. in the usual way, and when getting creamy on cooling, add a warm solution of the borax in the water, then add the perfumes.

VANISHING CREAMS.

Vanishing cream is a very interesting cosmetic. It disappears when rubbed over the skin. It consists of stearic acid, partly saponified with alkali, the bulk of the fatty acid being emulsified by the soap thus formed. The general manufacturing procedure is as follows: The stearic acid together with other oils or waxes if any, are melted in a steam jacketed kettle and strained into a mixer. The alkalies, glycerine, and water are heated to a temperature of 80°C in another kettle. This solution is strained into the melted fats with continual stirring. This stirring is continued until the cream forms a white, firm emulsion, the perfume being added at approximately 40°C.

Recipes:—

I.

Stearic acid	17 parts.
Sodium carbonate	$\frac{1}{2}$ part.
Potassium hydroxide	$\frac{1}{2}$ part.
Glycerine	6 parts.
Water	71 „
Alcohol	4 $\frac{1}{2}$ „
Perfume	$\frac{1}{2}$ part.

Melt the stearic acid. Make a solution of the alkalies in one-third of the water, add the glycerine. Then add the solution with steady agitation to the melted fats, continue stirring until emulsification has taken place; then add the remainder of the water heated to some

temperature. Continue stirring until temperature has dropped to about 40°C. Dissolve the perfume in the alcohol and stir this in. Allow the batch to stand aside for a day before filling.

II.

Stearic acid	180	grams.
Potassium carbonate		
crystals	12	"
Glycerine	50	c.c.
Water	750	"
Bergamot oil	4	"
Lavender oil	1	"
Ylang ylang oil	1	"
Vetiver oil	$\frac{1}{2}$	"
Rose geranium	$3\frac{1}{2}$	"
Proceed as before.		

III.

Stearic acid	130	grams.
Borax crystals	38	"
Sodium carbonate	12	"
Water	800	c.c.
Glycerine	50	"
Geranium oil	9	"
Patchouli oil	1	"

Melt the stearic acid on a water bath and pour it into the boiling solution of glycerine, water, borax, and soda. Continue boiling until the mixture gelatinizes. Cool and add the perfume.

IV.

Stearic acid	4 lbs.	12 oz.
Glycerine	8 lbs.	8 "
Distilled water	14	pints.
Stronger ammonia		
water	4 oz.	6 dr.
Cologne spirits	1	pint.
Oil of hyacinth	6	drops.
Oil of Jasmine (art)	4	dr.
Art. musk (crystal)	20	grains.
Terpineol	2	oz.

Melt the stearic acid on a water bath at 75° to 80°C. Heat 2 lbs. of glycerine with 12 pints of water to the same temperature; add the ammonia water; and pour slowly into the melted stearic acid, with constant stirring. Mix the rest of the glycerine and water and heat to 80°C.; pour this into the first mixture, with constant stirring; keep the temperature constant and stir for about 15 minutes. Remove from the heat and beat until cold. Mix the perfume materials with the spirits and add this slowly, with constant beating, to the cream.

HAIR CREAMS.

The ideal hair cream should be thick but it should be miscible with water as it is intended for fixing the hair in position and giving it a pleasing glossy appearance. A few good recipes follow:—

I.

Trihydroxyethylamine	
stearate	7 parts.
Spermaceti	3 "
Liquid paraffin	25 "
Distilled water	65 "
Perfume	a sufficiency.

Dissolve the stearate and spermaceti in the liquid paraffin over a water bath. While still warm, run in the water, previously warmed stirring vigorously until quite homogeneous and cool, working in the perfume as the cream cools.

II.

White wax	10 parts.
Liquid paraffin	130 "
Distilled water	15 "
Borax	1 part.

Melt the wax in 50 parts of liquid paraffin. Place in a mortar and stir in the

remainder of the liquid paraffin. Add the distilled water in which the borax has been dissolved and stir the cream formed consistently until cold.

Perfume specially suitable for this class of cream is composed of:—

Lemon oil	50 parts by volume.
Lime oil	30 " "
Bergamot oil	20 " "

Only one part of this perfume can produce good result in 99 parts of cream.

HAIR LOTIONS.

Hair lotions have a stimulating effect upon the hair follicles. They are generally perfumed with oil of rosemary as it possesses a good stimulating property.

A few recipes follow:—

I.

Tincture of cantharidin	5 c.c.
Solution of ammonia	50 "
Borax	25 grams.
Glycerine	50 c.c.
Rosemary oil	10 "
Alcohol 90 per cent.	125 "
Rose water	200 "
Orange flower oil	300 "
Water to produce	1,000 "

Dissolve the oils in the alcohol, and borax in the glycerine and water. Then mix the two solutions and make up to volume with water.

II.

Rectified spirit	20 fl. oz.
Rose water	10 fl. oz.
Oil of lemon	2 dr.
Rose otto	7 drops.
Clove oil	15 drops.
Neroli oil	5 drops.

Mix the oils in spirit and shake until dissolved. Then add the rosewater and allow to mature for about a month.

III.

Rectified spirit	20 fl. oz.
Rose water	4 oz.
Orange flower water	4 oz.
Oil of lavender	1 dr.
Oil of clove	1 dr.
Oil of bergamot	2 dr.
Musk artificial	2 grains.
Mix the ingredients together and shake well until dissolved.	

IV.

Cantharidin	.02 gram.
Acetic ether	1 c. c.
Glacial acetic acid	6 c. c.
Bayrum	250 c. c.
Glycerin	50 c. c.
Water to produce	1000 c. c.

Dissolve the cantharidin in the acetic ether and add to the bay rum. Then add the other materials.

V.

Acetum cantharides	15 c. c.
Alcohol	150 c. c.
Rosemary oil	15 c. c.
Bergamot oil	10 c. c.
Lavender oil	5 c. c.
Rose oil	5 c. c.
Glycerine	50 c. c.
Water to produce	1000 c. c.

VI.

Pilocarpine nitrate	5 gram.
Alcohol	90 c. c.
Tincture of cantharidin	10 c. c.
Heliotropin	5 grams.
Verbena oil	3 c. c.
Lavender oil	2 c. c.
Glycerine of borax	50 c. c.
Water to produce	1000 c. c.

VII.

Quinine sulphate	2 grams.
Tincture of cantharidin	8 c. c.

Eau de cologne	750 c. c.
Iso-butyl salicylate	5 c. c.
Orange flower water to produce	1000 c. c.

Dissolve the alkaloid in the cologne, add the tincture and the isobutyl salicylate. Mix the glycerine with 200 c.c. of the water, and add.

VIII.

Quinine hydrochloride	3 grams
Pilocarpine hydrochloride	1 gram.
Lavender water	200 c. c.
Glycerine	20 c. c.
Rose water to produce	1000 c. c.

Dissolve the alkaloidal salts in the lavender water and proceed as above. Filter, if necessary.

FACE LOTIONS,

These are generally sold as complexion beautifiers.

I.

Lactic acid, syrupy	5 c. c.
Glycerine	100 c. c.
Tincture benzoin	10 c. c.
Tincture of styrax	10 c. c.
Patchouli R	1 c. c.
Rose synthetic	4 c. c.
Rose water to produce	1000 c. c.

Dissolve the perfumes in the tinctures and add to the glycerine. Shake with 800 c.c. of water and then add the acid. Make up to volume with more rose water.

II.

Hydrogen peroxide	
10 vols:	100 c. c.
Tincture benzoin	10 c. c.
Muguet synthetic	5 c. c.
Rose water to produce	1000 c. c.

SUN BURN LOTION.

Zinc hydroxide (25 p. c.)	100 grams.
Zinc carbonate	70 "
Corn Starch	30 "
Glycerin	50 c. c.
Tincture of benzoin	50 c. c.
Benzyl cinnamate	2 grams.
Heliotropin	5 "
Tuberoase absolute	1 gram.
Water to produce	1000 c. c.

Dissolve the perfumes in the tincture of benzoin. Tint the powders with Armenian bole if desired.

BRILLIANTINES.

Brilliantines are generally used for imparting lustre to the hair. The liquid types are more popular among women. They are simply mixtures of equal parts of olive oil or castor oil and a double or triple extract according to the desired cost. The bottles are half filled with oil, and the extract is added. Extracts use for this purpose must not contain water, for in this case the oil and the extract will separate into two layers in the bottles; the bottle is shaken before use and a milky emulsion is formed which disappears when the brilliantine is left undisturbed again.

A few good recipes follow:—

I.

Castor oil	1 kilo-gram
Alcohol	1 litre.
Ylang ylang oil	5 grams.
Linalol	10 "
Terpineol	5 "
Gum benzoin infusion	35 "

II.

Castor oil	1 kilo gram.
Alcohol	1 litre.
Artificial oil of rose	2 grams.

Geranium oil	5 "
Geraniol	5 "
III.	" "
Liquid paraffin	600 grams.
Alcohol	400 "
Extract of heliotrope	50 "
Amorphous heliotropin	1 gram.
Crystalline vanillin	1 gram.

IV.

Glycerine	40 parts.
Alcohol	40 "
Water	19 "
Perfume	1 part.

Mix the perfume and alcohol. Add the glycerine to the water. Then add the perfumed alcohol and mix.

V.

Light white mineral oil	7½ parts.
Sweet almond oil	15 "
Castor oil	3 "
Parahydroxybenzoic acid	1½ "
Alcohol	5 "
Perfume	1 part.

Dissolve the parahydroxybenzoic acid and the perfume in the alcohol; then mix in the sweet almond oil. Mix the mineral and castor oils and add the sweet almond oil mixture. Allow to stand for three days and filter.

VI.

Castor oil	2 dr.
Almond oil	4 oz.
Perfumes	15 drops.
Absolute alcohol to produce	6 oz.

VII.

Castor oil	2 oz.
Rectified spirit, 60 p.c.	8 oz.
Oil of neroli	5 drops.
Oil of rose-geranium	10 "
Oil of verbena	5 "
Oil of lemon	½ dr.

JELLY BRILLIANTINES.

White beeswax	5 parts.
Spermaceti	4 "
Stearic acid	10 "
Light mineral oil	80 "
Perfume	1 part.

Melt the waxes and fats and heat the oil in another vessel; then mix the two together thoroughly at the same temperature so that the waxes do not crystallise. Perfume at 45°C.

II.

White mineral oil	67 parts.
Petrolatum	22 "
Cerésin	10 "
Perfume	1 part.
Proceed as above.	

TOILET WATERS.

CANANGA WATER.

Oil of cinnamon	1 part.
Oil of nutmeg	1 part.
Oil of clove	2 parts.
Oil of cananga	2 "
Tincture of musk	1 part.
Tincture of storax	2 parts.
Tincture of vetiver	5 "
Alcohol	2000 "

Mix, set aside for 15 days, then add 1200 parts of water in which 20 parts of alum have been dissolved. Mix, and after 24 hours filter through magnesia.

LAVENDER WATER.

Oil of lavender	4 oz.
Grain musk	15 gr.
Oil of bergamot	2½ oz.
Otto of rose	1½ dr.
Oil of neroli	½ dr.
Spirit of nitrous ether	2½ oz.
Rose water	12 oz.
Alcohol	100 oz.

The mixture should be allowed to

stand for six weeks before clarification by filtration, which aids in maturation.

II.

Oil of lavender	4 oz.
Oil of bergamot	6 dr.
Oil of lemon	2 dr.
Oil of neroli	$\frac{1}{2}$ dr.
Oil of clove	$\frac{1}{2}$ dr.
Musk	6 gr.
Rose water	10 oz.
Alcohol	1 gal.

EAU DE COLOGNE.

I.

Oil of lavender	1 grm.
Oil of orange flower	1.5 grms.
Oil of bergamot	2 "
Oil of lemon	2 "
Alcohol to make	200 "

II.

Oil of bergamot	10 gram.
Oil of orange	10 "
Oil of lemon	10 "
Oil of orange flower	2 "
Oil of rosemary	2 "
Alcohol	1000 "

III.

Oil of Portugal	$\frac{1}{2}$ dr.
Oil of lemon	$\frac{1}{2}$ dr.
Oil of bergamot	12 drops.
Oil of neroli	Oil of neroli
Oil of petitgrain	3 "
Oil of rosemary	4 "
Alcohol	16 oz.

HEADACHE COLOGNE.

Menthol	480 gr.
Oil of bergamot	10 drops.
Oil of lavender	20 "
Oil of lemon	8 "
Oil of cassia	2 "
Spirit of camphor to make	4 oz.

FLORIDA WATER.

Oil of lavender	$\frac{1}{2}$ oz.
Oil of bergamot	1 oz.

Oil of cassia	1 dr.
Oil of clove	$\frac{1}{2}$ dr.
Oil of neroli	$\frac{1}{2}$ dr.
Essence of musk	$\frac{1}{2}$ oz.
Alcohol	64 oz.
Cinnamon water to make	80 oz.
Mix in the above order.	

VIOLET WATER.

Oil of sandal	4 dr.
Oil of bergamot	4 dr.
Oil of rose geranium	1 dr.
Oil of neroli	1 dr.
Oil of bitter almonds	15 drops.
Musk	1 gr.
Tincture of benzoin	4 dr.
Powdered orris root	2 dr.
Water	60 oz.
Alcohol	100 oz.

Macerate 30 days and filter. The product is coloured with just a trace of green dye.

LIP SALVES.

Lip salves are generally used for preserving the lips from too violent action of the air and are largely used by ladies of culture not only to prevent chapping or cracking of lips but also to impart colour and life to the mouth. The preparation of these articles is extremely simple and needs little care but scrupulous cleanliness, particularly in the mixing.

The requirements of a good lip stick are that it must not be injurious, it must spread easily without being excessively greasy; its colour must be reasonably permanent; it must not sweat, crumble nor crack. In addition to these requirements, its colour must be absolutely uniform, unchanging and free from mottling.

To secure these advantages it is necessary to make the stick by combining

two or more waxes in such proportions as the stick will soften at body temperature and which will contain substances designed to function as lubricants and others to promote the absorption and permanency of the colour. Practically all of the waxes and most of the fats can be used in the manufacture of lip sticks.

A few recipes follow:—

I.

White wax	1½ oz.
Almond oil	3 oz.
Carmine	6 gr.
Otto of rose	6 drops.

Melt the oil and wax together. Dissolve the carmine in just enough solution of ammonia, put in a warm mortar, and add the basis; stir constantly until it sets, adding the otto towards the end of the process. Lastly it is cast into sticks of desired sizes.

II.

Benzoated olive oil	16 oz.
White wax	8 oz.
Spermaceti	1 oz.
Alkannin	15 gr.
Cinnamin	1 dr.
Oil of Jasmine	½ dr.
Otto of rose	5 drops.

Melt the wax and spermaceti in the olive oil by heat; dissolve the alkannin in about ½ oz. of this mixture in a test-tube and add to the rest. Stir constantly, adding the perfumes last.

III.

Soft paraffin, white	62 parts.
Ceresine	3 "
Carmine	5 "
Eosin	2 "

Melt the mineral waxes together over a water bath and then grind in the finely powdered mixture of carmine and

eosin. Then pour the hot liquid into moulds to set. The sticks, of course, may be scented by the addition of about one-half per cent of coumarin or other suitable perfume material.

NAIL POLISHES,

I.

Celluloid film, cut small	250 parts.
Amylacetate	250 "
Acetate	750 "

Mix the last two ingredients and add the first. Allow to stand until dissolved.

II.

Stannic oxide	300 grams.
Talc	300 "
Osmo-kaolin	100 "
Tragacanth	2 "
Glycerine	50 c.c.
Citral	1 c.c.
Water to make	1,000 c.c.

Rub the powders in a mortar with the glycerin, perfume and water, then pass through fine muslin.

NAIL POLISH REMOVER.

Acetone	6 parts.
Ethyl acetate	4 "
Mix.	

NAIL BLEACH.

I.

Oxalic acid	½ part.
Citric acid	10 parts.
Rose water	90 "
Dissolve the acids in rose water.	

II.

Acid sulphuric, dil.	2 dr.
Tincture myrrh	1 "
Lavender water	3 "
Water	4 oz.

To whiten the nails, dip the tips of the fingers in the lotion after washing, dry, and polish with chamois.

FINGER-TIP COLOURING.

Alkanet	$\frac{1}{2}$ oz.
Rectified spirit	12 "
Rosewater	4 "

Macerate for a week, add 10 drops of otto of roses, shake, and filter.

A solution of eosin is also used; it should be made with perfumed spirit.

NAIL POLISHING POWDER.**I.**

Oleate of tin (in powder)	2 oz.
Powdered pumice	$1\frac{1}{2}$ "
Oil of lavender	5 drops.

Mix well by trituration, and sift three times through a sieve No. 120.

II.

Putty powder	8 oz.
Carmine	20 grains.
Otto of rose	6 drops.
Oil of neroli	5 "

Triturate well together.

BLEACHING & FRECKLE LOTIONS.

The function of bleaching lotion is to lighten the colour of skin, which has become darker than normal through exposure to sun and wind and to remove freckles.

Among the most effective ingredients are the mercury compounds, lactic acid, citric acid, peroxides and perborates of zinc, magnesium and sodium, and also hydrogen peroxide. Owing to the fact that mercury compounds are extremely poisonous, it is better not to use these materials at all in these preparations.

The following formulas are illustration of various types of bleaching and freckle lotions:—

BLEACHING LOTION.**I.**

Hydrogen peroxide	60 parts.
Tincture of benzoin	3 "

Witch hazel	36 $\frac{1}{2}$ "
Perfume	$\frac{1}{2}$ part.

Mix the tincture of benzoin, perfume and witch hazel with the peroxide. Filter and fill at once.

II.

Lactic acid	3 parts.
Acetic acid	2 "
Citric acid	4 "
Ether	10 "
Alcohol	10 "
Perfume	$\frac{1}{2}$ "
Water	70 $\frac{1}{2}$ "

Dissolve the citric acid in the alcohol and the acetic acid in ether. Mix the lactic acid with the water, add the citric acid solution, and mix again, add the acetic acid solution. Rub up the perfume with a little purified talc and add this last. Allow to stand over night and filter.

FRECKLE LOTION.**I.**

	per cent.
Potassium chlorate	1.2
Borax	1
Potassium carbonate	3.7
Sugar	3.7
Glycerine	9
Rose water	20
Alcohol	10
Distilled water	51
Perfume	4

Make separate solutions of the potassium carbonate and potassium chlorate and borax with small quantities of water. Dissolve the sugar in the remainder of the water. Add the glycerine and rose water; mix, then add the other solutions individually, mixing before each addition. Add alcohol and perfume.

II.

Acetic acid	3 per cent.
Lime juice	10 " "
Glycerine	6 " "
Water	70½ " "
Perfume	½ " "
Alcohol	10 " "

Dissolve the concentrated lemon juice in the water and the acetic acid in the alcohol. Mix the perfume with the glycerine and add to the lemon juice solution, then add the acetic acid solution. Mix and filter.

III.

Ammonium chloride	10 grams.
Glycerine	40 c.c.
Alcohol	100 "
Liquor carmine	1 "
Mimosa synthetic	2 "
Amber liquid	2 "
Rosewater to produce	1,000 "

IV.

White vaseline	1 kilo. 800 c.c.
Borax	70 grams.
Oil of bergamot	15 "
Oil of geranium	9 "

This is an excellent preparation for whitening the skin.

ROUGES.

Paste rouges are mixtures of waxes and fats suitably coloured and perfumed. They can be made from lip stick base by decreasing the percentage of wax to make a mass of pasty consistency. As a rule, however the concentration of colour in lip stick mass is too great for practical use as paste rouge. It is most essential that paste rouge be extremely easy to apply. The following are examples:

I.

White beeswax	11½ parts.
Benzoated lard	10 "
Petrolatum, (ointment grade)	70 "
Aniline violet	½ part.
Cosmetic lake colour	8 parts.
Perfume as desired	½ part.

Melt the beeswax, lard and petrolatum. Stir in the colours and perfume. Run through a mixing mill and then pour directly into the containers.

Now, in order to prepare rouges of several colours it is most convenient to prepare an uncoloured base. This is then divided up into portions each of which is to be suitably coloured for the requirements of each shade. Such a base can be made as follows:—

White beeswax	5 parts.
Stearic acid	7 "
Cetyl alcohol	3½ "
Petrolatum, ointment grade	77 "
Mineral oil	7½ "
Melt over a water bath and mix.	

ROUGE STICKS.

Rouge sticks are very similar lip sticks but these are slightly greasy and soft than the latter. The ideal lip rouge will rub on smoothly and does not come off easily. The carmine content should not exceed 20 per cent, but the majority are made with much less. If a bright colour is desired, it can be obtained by the addition of zinc oxide.

METHOD OF MANUFACTURE.

The general method of manufacture consists of melting and straining the fats and rubbing down the pigment in a warmed mortar with them, but for large-scale production, where a perfectly fine, smooth, and grainless article is desired, the warmed mass should be milled. Formulas are appended:—

I.

Liquid paraffin	300 c.c.
Lanolin anhydrous	150 grams.
Ceresine (high m.p.)	350 "
Carmine	200 "
Linalyl cinnamate	1 c.c.

II.

Ceresine	300 grams.
Almond oil	50 c.c.
Soft paraffin	500 grams.
Zinc oxide	50 c.c.
Carmine	100 c.c.
Piperonal-vanillone	1 gram.

SACHET POWDERS.

We now consider with the preparation of sachet powders. The use of

these powders is without doubt the most economical method of communicating an agreeable smell to linen, clothing, gloves, and other toilet articles, and at the same time preserving them from the destructive action of certain insects, which are kept away from ward robes, etc., by a delicate perfume.

In making these sachets only perfumes which donot alter with keeping are used. Rosewood, lavender flowers, sandalwood, orris root, vetivert root, tonquin beans in fine powder, are most suitable for making these articles. Gum benzoin, tolu, styrax, cloves, cinnamon and other similar products are equally suitable. To increase the perfume of sachet powders a number of artificial perfumes in crystal or powder form may be used such as heliotropin, vanillin, coumarin and even essential oils, but these last should be used with care, so as to avoid staining the linen.

I.

Orris root	1 kilo.
Rose petals	1 "
Gum benzoin	300 grams.
Vanillin	30 "
Geranium oil	10 "
Heliotropin	90 "
Musk pods	50 "

Reduce these substances to a fine powder. Triturate them with the perfumes, if any are to be added. Place the

powder between two pieces of wadding and put a pinch on each of the exterior sides, and lay the wadding inside a bag of silk prepared for the purpose.

II.

Violet root powder	1500 parts.
Patchouli oil leaves	120 "
Sandalwood	120 "
Rose oil	2 "
Neroli oil	2 "
Sandal oil	2 "
Powdered musk	10 "
Civet	5 "

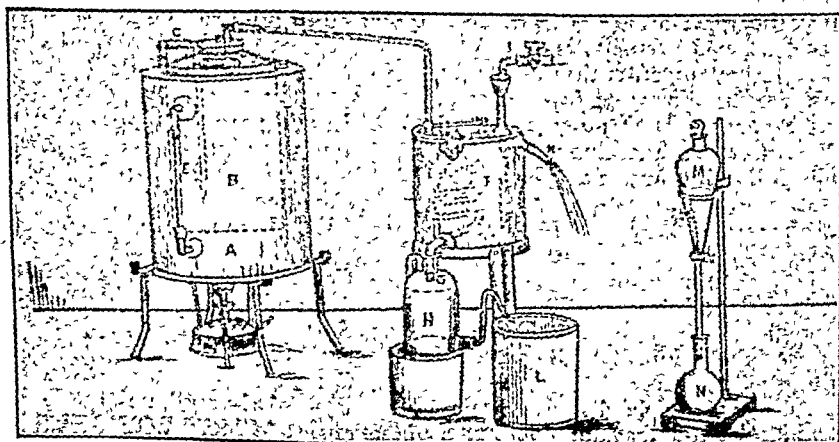
III.

Sandal wood	1 kilo.
Rose petals	1 "
Cedar wood	1 "
Lavender flowers	300 grams.
Artificial musk	3 "
Rosewood oil	30 "
Artificial neroli oil	8 "

IV.

Rose petals	1 kilo.
Rosewood	1 "
Orris root	1 "
Gum benzoin	300 grams.
Art. oil of rose	30 "
Geranium oil	10 "
Geraniol	1 gram.
Musk pods	40 grams.
Coumarin	1 gram.
Neroli oil	4 grams.

Proceed as above.



Distilling Apparatus.

How A Sugarcane Grower can Double His Profit.

THE cultivation of sugarcane crop and the improvement of sugar industry in India have, of late been much in the foreground of the people's attention. This is chiefly due to the strong protective Tariff policy of the Government of India recently directed against sugar import. It must however be admitted that sugar is one of the many important and indigenous industries of India which was being neglected till very recently.

The industry has of late attracted the attention of the public in all parts of the country and attempt is being made not only to grow sugarcane in large areas but also to start investigations on the manufacture of sugar, so that India may become self-contained within the fifteen year limit proposed by the Government. Though a very suitable tract for this industry Orissa is still lagging far behind. It must however be admitted that there are several serious drawbacks here. Cane is not yet grown in sufficient quantities, and in compact areas. There is also lack of organised capital for installation of sugar factories, and at the same time the numerous methods adopted in other parts of the country in manufacture of sugar is little thought of. Orissa should not miss the opportunity given by protective tariff within the allotted period. The area under sugarcane in Orissa has increased from 6,500 acres in 1930 to 11,500 acres in 1932. But little attempt has so far been made for its intensive cultivation which is mainly due to slump in the Gur market. Large profits

were made by the cane growers when after the great war supply of sugar was highly restricted. But the period of prosperity has come to an end. The main problems which demand a careful consideration are the increase in production and the decrease in cost of each ton of cane grown. Due to the bad quality of the Gur offered in the market, people have to go in for white sugar even at a higher price. The manufacture of white sugar on a factory scale may not be an easy task for Orissa but it can be taken up as a cottage industry by means of pan system which was recommended by the Imperial Council of Agricultural Research. The experiment was introduced in 1933 in the Cuttack agricultural station and it was found quite suitable for Orissa. If this simple process for manufacturing white sugar be adopted in suitable centres either by well-to-do cultivators or even on a co-operative basis, it would fetch considerably a larger profit to the cane-growers. "The working cost of preparation of white sugar by open pan system" is described in the following paras.

Sugarcane is grown on every kind of soil, provided there are facilities for irrigation. But well drained clay loam above the flood level close to water is most congenial. Six to eight deep ploughings and cross ploughings followed by a few ladderings are enough for the preparation of the land. The field is to be divided into furrows and ridges three feet apart from one another and nine

inches deep with a water channel at the top and drainage channel along the lower part of the field. 30 maunds of seed-canes with 3 to 4 healthy eye-buds in each set are sufficient to cover an acre of land. The crop being an exhaustive one, it should be liberally manured. 20 to 25 cart-loads of well rotten cow-dung with 3 to 4 maunds of sulphate of ammonia in two doses as top dressing, (half to be applied at the time of planting and the other half during the middle of the rains) will produce a good and healthy crop. Plantation is generally taken up between January and March but better results are obtained if it is commenced in October and November; for in the latter period the soil is generally moist, and consequently an uniform germination is secured and no frequent irrigation becomes necessary. The foliage grows sufficiently to cast a shade at the base of the plants, and the roots penetrate deep into the soil during the hot weather. So there is little chance of evaporation from the field. Irrigation depends chiefly on the type of soil and humidity of a place. There are instances where sugarcane is grown even without irrigation. The land is generally irrigated at intervals of 20 to 25 days and each irrigation is followed by hoeing or surface moulching. Irrigation must however be stopped as soon as the monsoon sets in. But before monsoon the furrows are to be opened to make way for the rain-water. Sugarcane is an annual crop and its maturity is indicated when the flowers begin to shed from the inflorescence. An acre of good and healthy crop will produce about 1000 maunds of sugarcane and 100 maunds of Gur. Ratoon

crop thrives better in rich soils and requires the same treatment as the main crop. The cost of growing sugarcane in an acre of land may be calculated as follows:—

	Rs.	As.	P.
1. Preparation of Land.			
Ploughing, cross ploughing and laddering	3	0	0
Preparing furrows and ridges (20 men @ 2 as.)	2	8	0
Seed and planting (25 mds. seed-cane and 10 men for planting)	10	10	0
2. Manure and Manuring.			
20 cart-loads of cow-dung @ 0-4-0	5	0	0
3 maunds of Sulphate of Ammonia @ 4-8-0	13	8	0
Cost of applying the manure	2	0	0
3. After Operations of Tillage.			
Weeding two times (20 men @ 0-2-0)	2	8	0
Hoeing 5 times (50 men @ 0-2-0)	6	4	0
Earthing up (24 men @ 0-2-0)	3	0	0
4. Irrigation.			
Cost of irrigation 5 times	20	0	0
5. Harvesting & Preparation of Gur.			
60 men for cutting and stripping canes (distributed over 15 days) @ 0-2-0	7	8	0
Hire of the mill and pan (15 days)	10	0	0
Hire of bullocks (15 days)	7	8	0
2 men for driving bullocks (15 days)	3	12	0
1 man for feeding the mill with the canes (15 days)	1	14	0
3 men to attend the preparation of Gur and the furnace (15 days)	6	9	0
200 earthen jars for Gur	8	0	0
6- Rent of the Land	3	0	0
7. Miscellaneous.	3	7	0
Total	120	0	0
800 mds. of cane will give an outturn of 80 mds. of Gur @ 3-0-0 per md.	240	0	0
Then the profit from an acre of land comes to Rs. 240 - Rs. 120 =			
Rs. 120.			

Now this profit of Rs. 120/- per acre may be nearly doubled if the total outturn of Gur from an acre of land be converted into sugar and molasses. The cost of preparing white sugar from 100 maunds of Gur is never more than Rs 13 which is quite clear from the following account published in the Bihar and Orissa Co-operative Gazette Vol. XI No. 3 of 1933.

CAPITAL OUTLAY.

	Rs.	As.	P.
3 centrifugals @ Rs. 400/- each..	1,200	0	0
18 H. P. Petter Engine	1,300	0	0
Foundation, etc.	500	0	0

Total 3,000 0 0

Interest at 5%
Repair and depreciation } Rs. 600/- per year
at 15% on above
Allowing for 120 days of crushing, it comes
to Rs. 5/- per day.

RUNNING COST PER DAY OF 16 HOURS.

	Rs.	As.	P.
Crude oil—8 gallons	3	0	0
Lubricating oil	1	0	0
2 Mistris (in 2 shifts)	2	0	0
4 Coolies	1	8	0
2 Boys	0	8	0
Interest and depreciation	5	0	0

Total 13 0 0

Each centrifuge will take a charge of 40 lbs. of rab at a time which will be separated into white sugar and molasses in 10 minutes. In a working day of 16 hours, it will thus take a charge of 32 maunds of rab at say four charges per hour and a battery of 3 centrifugals will thus dispose of about 100 maunds of rab per day.

Cost of 100 maunds of rab for working at say Rs. 3-4-0 (average for the season) per maund, is Rs. 325/-. Therefore the working cost per day will be Rs. 325/- + Rs. 13/- = Rs. 338/- (including interest and depreciation).

Allowing 33½ per cent only sugar from rab (which is a modest estimate as it goes up to 40-45 % if the rab is properly made), 100 maunds of rab will turn out 33½ maunds of sugar which at the rate of Rs. 10/- per maund (which is also a very modest estimate as white sugar is about Rs. 12/- per maund) will sell, at

Rs. 333/- 60 maunds of molasses may be expected from 100 maunds of rab. At Cuttack farm it has been sold @ Rs. 1-14-0 per maund on spot. Allowing only Re. 1/- per maund for large scale production it will fetch about Rs. 60/-. That is, the total value of the turn-over for a 16 hour day is Rs. 393/-. Working cost per day including everything Rs. 338/- Therefore the profit per day may be Rs. 45/- and this with an investment of Rs. 3,000/- only. (The figures are based on the trial of the machine at Cuttack farm for one month only). Now the cost of preparing white sugar by "open pan system" is Rs. 13/- only. And the cost of growing 800 maunds of cane and preparing 80 maunds of Gur is Rs. 120/-. Therefore a cultivator gets a profit of Rs. 120/- from an acre of land as described above.

Now let us see that 80 maunds of Gur when converted into sugar will produce.

	Rs.	As.	P.
28 maunds of white sugar @ Rs. 10/-	280	0	0
52 maunds of molass @ 1/-	52	0	0
Total	332	0	0

Thus in the end the cultivator gets Rs. 332/- by means of converting 80 maunds of Gur into sugar against Rs. 253/- (Rs. 240/- being the gross income out of Gur plus Rs. 13/- being the extra charges as shown above) or in other words he makes an additional profit of Rs. 79/-.

—Sitanath Mahanty
MAYURBHANJ GAZETTE.

a while is unable to impart the information. Such a man gets as it were a sort of stage fright as soon as he comes in contact with a salesman. He came settled but appears quite non-plussed before the salesman, whom he sometimes suspects of an adroit and unfair move. The salesman's duty here is first to put the man at ease and then try to empty his till. The timidity of the customer usually leaves him, if the salesman has enough gumption to introduce himself with some witty and pleasant remarks probably quite foreign to the goods or if possible in keeping with the man's hobby. He should go on talking till he can steal out something of that man's intention. Timid folks are very sensitive and are easily offended. There is no waste of time to prolong the presence of such a guest. All what is needed is that the salesman has to be on his guard constantly while he talks with him. Any unusual move, abrupt action or a thrusting information will be resented or taken as affront. The salesman must assume an attitude of helpfulness, which however must be done sympathetically and not in a manner that imparts an impression of superior knowledge. Once the man has been induced to like the salesman's manner of waiting on him, there is no further difficulty in coming right to the question of purchase.

OTHER TYPES.

As with the above few types, so with all the rest—the same rule guides everywhere. The salesman must have a trained eye and shrewd instinct to read into men's minds, for then only can he place his cards on the table. Customers are slow to change their first impressions.

Once a salesman has succeeded in winning the customer, provided the store can cater to his needs. But a slight error of judgment is nowhere so fatal as here. The customer will give that store a bad name and eschew all relations with it, if he happens to be badly impressed once, even though he may not have received any ill-treatment.

MAKING A RAILWAY CLAIM.

WHEN taking delivery of consignments by railways it is important that the consignee examines his goods immediately they come into his possession. If he goes to the railway station to fetch the traffic he should make a careful external examination of each and every parcel forming the consignment before he definitely accepts delivery, and certainly before he gives a signature as a receipt for the consignment. If on the other hand, the goods are carried by the railway company to the consignee's door, a scrutiny should be made directly the consignments are tendered for acceptance and a careful examination made of the whole lot before any signature is given.

HOW TO PROTECT YOURSELF.

If anything is noted amiss at the time of arrival, a careful note in accordance with the exact condition of the goods should be made on the railway company's delivery sheet against the consignee's signature so that it cannot afterwards be said that the goods were in perfect order when delivered and "nothing is known of any damage or breakage having occurred during transit"—to quote a stock argument.

It is a very good plan whenever it is possible to pass each package over the scale before a signature is given. The reason is obvious. Occasionally a robbery will take place during transit and it will be impossible to detect by means of an external examination that anything of the kind has happened; whereas on weighing the package the irregularity may be discovered. As an instance on the car man's delivery sheet the weight of the consignment may be shown as 20 seers but on scaling the package, it may be found to weigh only 16 seers. This would be quite sufficient to arouse suspicion and would certainly justify a claim if it is discovered on unpacking that a portion of the goods have been extracted.

Many traders fail altogether to protect themselves when either forwarding goods by railway or receiving goods from the hands of a railway company after the conveyance has been effected and then wonder why it is that they cannot secure any compensation from these carriers when any thing goes amiss. It is curious, to say the least of it, that whereas a trader will make a careful note as to what are the conditions under which he can secure the very best terms from his suppliers in the matter of discount for example and sees to it that his allowance thus due to him, the same man will neglect altogether to study how best to secure his legitimate rights from the hands of the big carrying concerns.

FORM OF A CLAIM.

A railway claim like an invoice to a customer for goods supplied, should be fully detailed and drafted somewhat as follows:

The B. N. R. Ry. Co., Bombay.

Drs. to Messrs. Blank & Co., Canning House, Bombay.

To value of 30 pairs of dhoties.

Stolen in transit from one case ex-Cotton Mills, Nagpur.

Delivered to us this morning.

30 pair of dhoties @ Rs. 2-14 per pair Rs. 86-4.

Reference No. C. 519.

Kindly acknowledge receipt of this claim and note.

This confirms our complaint to your carman at the time of delivery.

Of course the claim should be a precise statement of facts that is, it should give such informations as can be verified to any railway official who may seek to check the details without delay; and the footnote should refer to any pertinent fact which will enable the railway company's official to check the statement immediately on receipt of the debit note at the goods station.

It is important that an acknowledgement of each claim should be asked for and that an acknowledgement be obtained. Sometimes it happens that a railway claim will get mislaid or perhaps lost in the post and in such an event, if a reminder is sent to the railway company and the company's agent cannot trace receipt of the original demand, the claimant will probably be told that there is no trace of the original and "at this distant date no liability can be admitted."

TIME LIMIT.

There is no general rule governing the preparation and presentation of each and every railway claim so far as time limit for claims is concerned. All that is possible to say in this connection is that a railway claim should be presented to the company at the earliest possible moment. There are certain rules which are common to all leading railway companies. These allow three to fifteen days' time after the delivery of goods for lodging claims for damage suffered by goods in transit. And many a claim has been rejected by the railway companies because it has not been made within the time specified in this condition.

Strictly speaking, it is the owner of the goods who should make the claim upon the railway company and as, in the great majority of cases, it is the consignee who is the real owner of the goods, it is he who should make the claim.

IN THE INSURANCE FIELD.

BY OUR INSURANCE COMMISSIONER.

Italian Insurance in 1934.

Economic conditions in Italy during 1934 continued fairly stable, due to the efforts of the Fascist regime which extended its control over all commercial and individual life. The industrial situation improved during the year, but in spite of this there is still much unemployment. Foreign trade is much hampered by currency restrictions both in Italy and in the neighbouring States. In the insurance market there was further consolidation by several amalgamations and absorption of smaller companies which was accompanied by capital increases in several cases. While this tends towards a strengthening of security for policy holders, it has certain disadvantages. In the various branches of business generally there seems to have been an upward trend. Income has been well maintained by most companies in face of difficulties. Life assurance showed an additional new production by most companies. In fire business the premium income showed a small reduction, but the results were satisfactory. There was one loss of any magnitude, which occurred on a motor and aeroplane works at Milan, producing a loss of £ 35,000. Burglary business was small but profitable although the expenses of acquisition seem to be too high to allow of large profits. Hail business was catastrophic, owing to extremely bad storms prevailing in many districts, and the average claims ratio was 100 per cent. The business labours under great difficulties. Meteorological conditions

over long periods demand increased ratings but the unprofitable state of agriculture and the resultant inability of farmers to pay adequate rates produces a situation for which it is difficult to find a remedy. Accident and third party business have shown a reasonable profit generally. Most of the minor branches included in the accident portfolio have also shown a profit. Air craft insurance again proved unprofitable. Motor business showed more activity generally, but the results were unsatisfactory. Unlimited third party insurance has been prohibited by the Italian Ministry of Corporations as it is considered that the risk is too heavy. Marine and transport business continued to contract in income. Cargo business produced no satisfactory results. In order to stimulate the market, pressure is being brought to bear on importers and exporters to insure all consignments with Italian concerns. Italy possesses a very important re-insurance market, a large amount of business being accepted and ceded also by her many direct companies.

Insurance and Foreign Exchanges.

These are critical days for two great nations, France and the United States, in the one case owing to the attack on the Franc, in the other owing to the fact that the N. R. A. measures have been declared unconstitutional. Insurance men, even more than most other men, are interested that the economic conditions in these two great countries—and in the

rest of the world for the matter of that—should become stabilised. This desire for stabilization—and for revival of world trade—is expressed over and over again in the speeches of the chairmen of great insurance companies. One of the latest contributions on the subject was made by Mr. A. E. Pattison, Chairman of the Royal in May last. In his address at the annual meeting, Mr. Pattison said that nothing would be more conducive to a general recovery than stable relations between the principal currencies. The prosperity of insurance enterprise was closely affected by these considerations and was intimately bound up with that of commerce and industry as a whole. Insurance is essential in every phase of trade and at every stage of industrial development. Continuing Mr. Pattison said: "Only by insurance can a satisfactory distribution of risk and responsibility be achieved. It enters into the structure of modern civilization, and in every transaction it is just as necessary to consider the insurance as the commercial and financial aspects. This is true not only at home but universally, and demonstrates the intimate way in which insurance follows the fortunes of trade." The industrial age has been both the cause and the effect of the enormous development of insurance in the last century in as much as commerce and industry have been so interwoven with insurance that the development of either of them on such a scale as has been made could have been contemplated without the existence of the other.

The Suspense Clause in Life Policies.

Some years before the world economic crisis life insurance companies in many parts of the world were beginning to consider whether it would be possible to extend the benefits of life assurance to the extent of almost abolishing the suspense clause in respect of death by suicide. The world depression, however, brought about a wave of suicides, notably in such countries as Germany, and an opposing movement commenced, leading in some countries to a tightening up of

the regulations as to payment in the case of death by suicide. One of the arguments advanced by the supporters of the suspense clause in respect of death by suicide is that nobody would take out an insurance policy with the determination of postponing suicide till the end of the period of suspense, and that the clause therefore serves a very useful purpose. Such a thing may, however, actually have happened in England where it was brought out at an inquest in Liverpool that the man who had committed suicide by poisoning had taken out a life insurance policy just two years ago. At that time the agent of the life assurance company had jokingly pointed out that there was a suicide clause in the policy, and that it would be void if suicide was committed before the end of two years from the inception of the policy. The two years had just elapsed when the suicide took place. The verdict returned was suicide with insufficient evidence to show the state of mind.

Bangalakshmi Insurance Ltd.

During the second year ending 30th April, 1934 the premium income was Rs. 7,423 which marked an increase of more than 60% over the 1932-33 figures. In the year under review, the Revenue Account leaves a surplus of Rs. 2,534 and by this amount the Directors have been able to write off the entire amount of Deficit of last year and make a beginning of Life-fund. In the year under review, there was only three Death Claims and the total amount of Death Claim paid is Rs. 94 only.

Urban Provident Insurance Society, Ltd.

During the year ending 31st December, 1934 the Company practically worked for nine months and proposals for Life Insurance received by the Company amounted to Rs. 48,008. Out of these proposals and those awaiting completion at the end of the previous year, proposals resulted into Policies assuring a sum of Rs. 43,108; the remaining were either declined, postponed or awaiting completion.

SMALL TRADES & RECIPES

Destroying Rats and Mice.

Dissolve 8 ounces of phosphorous in 1 gallon of hot water and add 10 pounds of corn meal; then rub up gradually and add 10 pounds of butter and 5 pounds of sugar.

Sen Sen.

Ext. Glycyrrhizae	1 oz.
Fine Sugar	$\frac{1}{4}$ oz.
Menthol Crystals	5 grs.
Otto of rose, according to taste.	

Otto of Musk, " "

Grind Ext. glycyrrhizae into very fine powder, then mix it with sugar and finally add menthol crystals and make into small globules of desired size. Ottos of rose and musk are to be taken in quantities according to taste. This is a good tonic for hoarse voice.

Syrup Hypophosphite.

Calcium hypophosphite, 45 grammes, Potassium hypophosphite 15 grammes, Diluted hypophosphorous acid, 2 mls; Glycerine, 50 mls; Sugar, 600 grammes; Distilled water, a sufficient quantity to make 1000 mls. Triturate the hypophosphites with 500 mls of distilled water, until they are dissolved, add the diluted hypophosphorous acid, filter the liquid and pass enough distilled water through the filter to make the filtrate measure 540 mls. To this add the glycerine and sugar, dissolve the latter by agitation without heat, and finally add enough distilled water, through the filter, to make the product measure 1000 mls. Strain if necessary.

Varnish for Violin Strings.

A good varnish for violin strings is made as follows:—

Coarsely powdered copal and glass each 4 oz.; 64 over-proof spirit 1 pint; camphor $\frac{1}{2}$ oz.; heat the mixture with frequent stirring in a water bath, so that the bubbles may be counted as they rise until solution is complete, and when cold decant the clear portion.

Cold Soldering.

Crush and mix 6 parts of sulphur, 6 parts of white lead, and 1 part of borax. Make a rather thick cement of this powder by triturating it with sulphuric acid. The paste is spread on the surfaces to be welded, and the articles pressed firmly together. Within a week the soldering is so strong that the two pieces cannot be separated even by striking them with a hammer.

Slate Pencil.

Ground slate	60 parts.
Ground limestone	30 parts.
Silicate of soda	10 parts.

Knead the ingredients together into a plastic mass and then force through a perforated plate. The pencils are next cut into desired sizes when dry. The shaping is done by laying the pencil in a trough, the bottom one being gripped automatically in a holder which revolves at an angle, and the end is held against a rough stone revolving at high speed in water.

India's Industrial Progress.

Indian Industries Association.

An organization called the Indian Industries Association has been formed in Bombay to safeguard smaller industries.

The idea is to watch the interests of those small industries which have sprung up in the last four years and which are likely to suffer from competition by old well established concerns in India.

The Association will try to create friendly feeling and a spirit of co-operation among persons engaged in commerce and trade and investigate into the methods of production, and consider the question of raw materials and shipping, banking, insurance and other facilities needed by the smaller industries. It will also secure organized action for the betterment of Indian industries by making representations to the Government concerned and devise publicity in India for articles produced by the smaller industries. A search for foreign markets will also be undertaken.

The Association will also try to form local guide of artisans, craftsmen, and persons engaged in similar trade.

Fruit Research.

A scheme for opening a Fruit Research Station in the vicinity of Bangalore with a view to investigating conditions favourable for the extension of fruit cultivation in the State is under consideration. It is expected that the Imperial Council of Agricultural Research, to whom the scheme will be

finally submitted, will render financial aid.

The scheme has been drawn up with great care by the Superintendent of Government Gardens and deals with the conditions favourable for fruit cultivation in the Mysore State, the present position of the indigenous and imported fruit trees, and the scope for the extension of their cultivation and research by the horticultural department. The site selected for the Station is in the vicinity of the Hesarghatta tank, by which the area would be irrigated.

The work on fruit culture, according to the latest official report, is carried on in the Government Botanic Garden and Central Fruit nursery at Bangalore and in the experimental orchard at Krishnarajasagara. Fruit plants numbering over two thousand five hundred, consisting chiefly of apples, oranges, grape fruits lemons and grape vines were imported from Australia and supplied to fruit growers.

Fruit Preservation in Mysore.

There are about 16,000 acres under mango and 18,500 acres under plantains, and there is a fairly large export trade with Madras, Bombay and Hyderabad.

The preservation of mangoes and pine-apples is a special feature of the work of the horticultural department. The demonstration of Cumquat oranges, citrons, and Nagpur and Coorg oranges in the form of marmalade, apples as jam

and jelly, red tamarind, wood-apple, limes and lemons as juices, and guavas in the form of jam was arranged for short-course students and orchardists to impress on their minds how wastage of fruits in certain seasons could be prevented.

Weaving Industry in Bihar and Orissa.

With a view to provide intelligent leadership so urgently needed in different industries and to improve the efficiency of the artisans themselves, the Industries Department in Bihar and Orissa maintains three handicraft institutes for imparting practical training to literate young men and artisan-boys in modern methods and labour-saving appliances employed in some important cottage industries.

The institute at Patna imparts training in cotton weaving, dyeing, calico printing, knitting and weaving of carpets, durries and newar tape, and in the making of toys out of wood and cardboard. The silk institute at Bhagalpur trains boys in sericulture, silk-throwing, dyeing and printing, weaving and designing. At Gaya, boys are taught improved methods of wool spinning, dyeing, weaving and finishing and production of various classes of woollen goods. The fundamental principle underlying the industrial training given in these institutes is that production by the students should, as far as practicable, be of marketable quality, both in respect of workmanship and finish, and the training should give the students a thorough knowledge of the craft or crafts taught and enable them to acquire sufficient manual dexterity for carrying out the work independently.

The Purdah section of the Cottage Industries Institute, now merged in the Handwoven Cloth-marketing Organization at Gulzarbagh, manufactures on a commercial scale and offers for sale art textiles in artistic designs and fast colours. These are used as bedspreads, curtains, table-covers and runners and furniture covers. These fabrics are available in about a hundred patterns, of which Sambalpur products are unique workmanship and typically Indian in design. The various designs are the creation of two expert European lady designers and are highly appreciated by customers both in India and Western countries.

Travancore to Have China-clay Refining and Porcelain Factory.

The Government of Travancore have, it is understood, sanctioned the starting of a china-clay refining and porcelain factory at Kundara, near Quilon.

An enormous demand exists already in mill areas for refined china-clay, which is used for sizing purposes, and it is at present supplied from England, Germany and some parts of India. The deposits at Kumbalom (four miles from Kundara) have been found to be eminently suitable for this purpose.

Sericulture Industry.

In pursuance of their decision to assist the development of the sericultural industry by annual grants for 5 years aggregating Rs. 1 lakh a year, the Government of India have sanctioned a total grant of Rs. 41,347 to the Government of Bengal for the current financial year

(1935-36) for expenditure on two schemes, viz:—

(1) Scheme for production and supply of disease-free seed cocoons through the agency of rearers under departmental supervision for industrial purposes—Rs. 38,847.

(2) Scheme for determining the comparative efficiency of disinfectants for the prevention of disease of silkworms—Rs. 2,500.

A New Iron Factory.

It is understood that plans are being considered by Japanese interests for installing a big Iron and Steel Factory at Amritsar with an estimated capital of four million pounds to produce 50,000 tons of iron and steel annually.

"Puttoo" Weaving in Kashmir: Improvements in Manufacture.

In Kashmir the Department of Industries has been steadily guiding the puttoo makers for improving their products. A very substantial degree of improvement has been effected in the matter of texture and strength of fabrics. A weaving demonstration party had spent about three years in Kashmir in demonstrating the use of improved appliances so as to speed up production. Dyeing demonstrations held during the last two years by the Havero Trading Company, had helped considerably in introducing fast dyes. Government had sanctioned an experimental station to improve upon the existing equipment of cottage work. A wool-spinning plant would be set up by a Government-aided capitalist to supply carded wool and machine-spun yarn to woollen weavers.

As the result of the efforts made to popularize woollen goods, the Indian Stores Department annually purchased loois from Kashmir, and as a direct assistance Government exclusively used locally-made puttoo for its requirements for the civil departments of the State and the Military Department was purchasing local woollen in increasing quantities.

India's Handloom Industry: Delhi Conference in October.

It is understood that the Government of India have issued invitations to the leading Provinces and States to participate in the seventh Industries Conference which it is proposed to be held in New Delhi on 28th. and 29th. October.

The Conference will be asked to review the working of important schemes which have been instituted for the development of the handloom industry, and it will also consider the possibility of taking steps for the encouragement of exhibitions or competitions relating to the handloom industry.

Following the grant of funds by the Legislative Assembly, allotments amounting to Rs. 5,73,500 have been made to different provinces and with the assistance of these funds, various schemes have already been started. These include for example, the training of weavers in improved methods of production, the establishment of sale depots and weavers' co-operative societies for the marketing of handloom products, and the introduction of new patterns, new designs and improved appliances. The Conference will examine the progress made in the schemes and will then advise on the

allotment of the funds available for next year.

The Conference will also be asked to consider the question of control of unregulated factories and particularly those small workshops which do not employ any power machinery. This is discussed in detail in Chapter VII of the report of the Whitley Commission, which made a number of recommendations on the subject. The Commission's investigations revealed the existence of serious abuses in a number of these workshops, in particular the employment of children under very unsatisfactory conditions. It is understood that the Conference will be asked to assist in framing suitable legislation, in this connection.

The minutes of the first meeting of the Imperial Sericultural Committee will also be placed before the conference for its consideration.

Handloom Weaving: Marketing Facilities Plan in U. P.

Important schemes have been drawn up by the United Provinces Government for the development of the cotton handloom weaving industry in the province. Apart from the scheme for a general survey of the industry, the Industries Department have elaborated two other schemes, which are estimated to cost about Rs 86,000 during 1935-36 and Rs 72,000 annually thereafter.

The Government think that it is not necessary to wait for the result of the survey before taking up other work. They have accordingly decided to make a start by providing proper marketing facilities and at the same time to ensure that the goods produced by handloom

weavers should be such as would appeal to the public and find a ready sale.

Cement Merger.

It is understood that a big Cement Corporation is being formed in Bombay which will buy up all existing cement companies at their present market value, and issue shares of the new Corporation equivalent to their value.

The idea underlying the proposed combination appears to be to effect a considerable saving in overhead and other charges. It is argued that every one of the companies has now a highly paid expert adviser but under the proposed combine there will be no need for separate expert advisers and there will be only one expert who will be the best man available.

A considerable saving is also expected to be effected by avoiding railway transit charges as far as possible. At present a cement company with its factory in the Punjab has to bring cement bags all the way down to Bombay or Madras if an order comes from these places but under the new arrangement the supply will be localised.

For instance, all order from the Punjab will be executed by a factory in the Punjab, orders from South India by a factory in South India—which means practically no transit charges. It is expected that the consumer will benefit from the proposed combine despite the fact that the present competition will cease.

It is believed that when the new Corporation is formed it will have an Indian majority on the Board of Directors.

Scientific & Technical Topics.

New Record.

Great interest centres in an invention by two Germans, Herr Basse and Professor Vorwreck, who, working in a field of investigation with many other technicians, have at last produced a gramophone record which will run for fifty minutes, thus enabling whole books to be recorded. In the welfare of the blind this is regarded as a great boon, since such records can be stored in the libraries of their institutions, and "read" with a minimum of disturbing interruptions. This non-stop method, too, is likely to prove useful in schools where long passages from the classics, spoken by men and women of elocutionary gifts, will bring home to young students the beauty of language and literature.

Cattle Fodder from Wood Pulp.

Synthetic food made from saw-dust soon may enter the realm of commerce. Experimenters have already succeeded in transforming small batches of wood pulp, by chemical treatments, into cattle fodder. Now Dr. Friedrich Bergius, celebrated German chemist, is developing the process on a large scale at Mannheim, Germany. Scrap logs are pulverized and "digested" in huge tanks where the non-edible cellulose of the wood is converted into edible carbohydrates. A mealy, nutritive fodder for livestock is the present product, with human food looming as a distinct possibility.

Fried by Wireless.

Professor Kovarczik, an Austrian scientist, performed ultra-modern miracles recently before the Biological Society. Taking a basin of very cold water he dropped into it live fish, pressed a button which released ultra-short waves, and the surprising result was hot fried fish cooked at freezing point. A raw vienna steak was next put into the icy-cold water, and the wireless waves cooked it in a cake of ice! The Professor holds that this radio cookery will in near future revolutionize our housekeeping.

New Vitamin.

Engaged in some feeding experiments with young chicks, two research workers of the Biochemical Institute of the University of Copenhagen, Dr H Dam and F. Schonheyder, discovered a mysterious bleeding-disease which they believed to be due to lack of hitherto unknown vitamin, they reported to "Nature," British scientific magazine.

Fed on hob-liver, or extracts from it, the chicks' blood promptly regained the power of clotting. The Danish investigators believe the factor involved can not be Vitamin E. and have tentatively named it Vitamin K thereby adding a seventh letter to the vitamin-alphabet.

X-Ray Movies.

X-ray movies, first demonstrated by German pioneers several years ago and now developed to a point well past the

experimental stage, are helping physicians to fight disease at the Victoria War Memorial Hospital in England. The new technique permits the filming of the bones and internal organs in action. One of its most important applications aids patients with joint diseases; for example, it is now possible to take motion pictures showing the action of the bones as a patient flexes his wrist, and, comparing films made over a period of time, to observe what progress has been made toward recovery. A movie camera photographs the X-ray images appearing on a standard fluorescent viewing screen, and the developed film is projected on a twelve-foot screen for examination, giving an effective enlargement of the original X-ray picture.

Electric Sandpaper.

The latest way of making sandpaper is by electricity. On a smooth sheet there are 250,000 grains to the square inch, and by a new process the sharpest edges are made to stand upwards and the grains or particles are evenly spaced. The paper first passes between two rollers where a thin coating of glue is applied. It then passes between two electrodes, charged with 100,000 volts, the grains being fed between these two points at the same time. They instantly become electrified and are forced into the glue with their edges standing upright. The high-tension current also causes them to repel each other with equal force by the elementary law of electricity, and they therefore become evenly spaced and form a perfect covering on the paper or cloth backing. Thus electrical sandpaper is accomplished with comparative ease in less time and with better results than by any mechanical means.

Russia's Robot Bricklayer.

A robot bricklayer, which will release countless hours of manpower for other work, is the invention of two young students of the Kieve Industrial Institute.

The new machine, which sets 58,000 bricks in seven hours and is operated by one man, is expected to be of great value to the Soviet Government in the drive to end the acute housing shortage that has lasted since 1928.

Of extremely simple construction; the robot runs on rails laid parallel with the wall to be built.

It has only one motor, and can be adapted to any system of bricklaying by a slight adjustment of the mechanism.

Shrinkproof Wood.

Tennis players, boat builders, inlayers of wood, makers of golf clubs want wood that will not shrink or warp. So do furniture makers. Now comes Dr. A. J. Stamm of the U. S. Forest Service to tell these workers in wood that their prayers have been answered. Wax is the wonder stuff.

The idea of utilizing wax for impregnation is not new. Those who tried to force it into dry wood failed because there were always millions of unsealed pores into which water seeped. Dr. Stamm devised an entirely new process. His cello-solve is an intermediary or transfer solvent. Inject it even into green wood—thereby doing away with tedious seasoning—and it crowds out the water.

Cellosolve boils at a lower temperature than water. Heat the wood and the water steams off and the cellosolve takes its place. The wood thus impregnated is placed in a bath of molten wax. Whereupon the wax dissolves into the pores, forces out the cellosolve and takes its place. Beeswax and stearin are the waxes most successfully used, but resin and linseed oil will do.

When green wood is thus treated it very nearly retains its natural size even in a damp atmosphere. There is no damage when the wood is dried and therefore no checking, bowing or twisting.

Formulas, Processes & Answers.

Etching Glass.

1107 J. C. C. Thaton--Desires to know the processes of etching glass, etc.

Smear the surface of the glass with beeswax; draw figures, lines, letters, monograms, or patterns with a sharp pointed steel and expose this surface to the fumes of hydrofluoric acid which is obtained by putting powdered flourspar into a leadsheet tray and pouring over it sulphuric acid; whereafter the tray is warmed a little.

Silvering Glass.

Dissolve 120 gr. of silver nitrate in 2 oz. of distilled water, and pour this solution quickly into a boiling solution of Rochelle salt in about 2 oz. of water. Now make a separate solution of 120 gr. of silver nitrate in 2 oz. of distilled water, and add ammonia until the precipitate is nearly redissolved. Make up to 24 fl. oz. with distilled water. For use mix equal quantities of the two solutions, just before the silvering is to be done.

Cement for Glass.

Casein	10 parts.
Water-glass	30 "
Water	20 "

Dissolve the water-glass in the water and then add the casein. This cement must be applied as quickly as possible, and the cemented articles dried in the air.

Removing Oil Stains from Cloths.

1134 D. B., Calcutta--Wants to know process for removing oil stains from cloths.

For removing oil stains from cloths you may proceed in the following way: Treat the affected part with 5 per cent. solution of caustic soda. Rub it for 15 minutes so that the oil is saponified. Lastly wash with water. If this fail then treat the stained part with benzine, or benzol or petrol. Rub lightly. The oil will gradually dissolve out. Lastly wash the affected part with soap.

Electrolytic Refining of Gold.

1175 G. S. S., Ludhiana--Wishes to learn the processes of refining gold and silver.

The only process employed for the electrolytic refining of gold is that devised by Dr. Wahlwill. The electrolyte used in this process consists of an aqueous solution of gold chloride containing 5 to 30 grams of gold per litre mixed with from 20 to 50 cubic centimetres of fuming hydrochloric acid per litre. Distilled water should be employed for the solution. Instead of using hydrochloric acid sodium chloride from 21 grams to 100 grams per litre may be used.

The anodes consist of bars of impure gold and containing lead, silver, platinum, palladium, irridium, etc. as impurities. When first inserted the anodes weigh

8.8 lbs. each and have a total surface (on both sides) of 1.1128 square feet.

The cathodes are made of thin rolled sheets of electrolytically deposited gold of the same length as the anodes, but are narrower, for during the course of the electrolytic action they rapidly grow in thickness in every direction. There is no formation of loose crystalline growths at the cathode even when the current density is as high as 100 amperes per square foot. The deposited gold is in fact dense and coherent.

The distance between the anodes and cathodes need not be greater than about 3 centimetres, and there is then no danger of a short circuit occurring due to metallic growths on the cathodes. It is a curious fact that at the commencement of the process, whilst the electrolyte is a comparatively pure solution of gold chloride with hydrochloric acid or sodium chloride, the cathode deposit is looser and less dense than it is after the soluble impurities from the anode have impregnated it with the chlorides of lead, etc. On this account at the starting of a new bath of solution it is usual to keep the anodes and cathodes further apart than the 3 cm. prescribed above, and the refiner changes the anodes more frequently in order to avoid the danger of a short circuit.

The electrolytic tank employed consist of porcelain or stoneware vats, upon which wooden frames are supported carrying the positive and negative copper conducting leads. On these leads there are resting copper cross bars, about nine per vat, from which four rows of anodes and five rows of cathodes hang. Several tanks are connected in series.

When all the arrangements have been kept ready a strong current having a density of 95 to 100 amperes per square foot is passed through. The impurities present in the anodes partly pass into the solution and partly deposited as anode sludge. This contains all the silver as chloride together with about 10 per cent. of its weight of gold. The gold thus deposited in the anode sludge is in the metallic state, but its presence is not due to the mechanical disintegration of the anode. The remaining gold is deposited on the cathode.

This gold has a fineness of over 999.8 part of gold per 1000.

Electrolytic Refining of Silver.

The electrolytic refining of silver is successfully carried out in the following manner. The process consists essentially of employing anodes of impure silver in a bath of dilute nitric acid, the silver is deposited upon sheet silver cathodes in the form of loosely adherent crystals the current density employed being as high as possible without producing inconvenient heating of the electrolyte. The operation is manipulated as indicated in the refining of gold.

Magic Serpent.

1184 K. K. K., Rawalpindi—Wishes to learn the formulas for preparing magic serpent and sparklers.

Fuse in a crucible equal parts by weight of yellow prussiate of potash and flowers of sulphur; it is advisable when the heat cannot be well regulated to include a little carbonate of potash. Lixivate the mass with water, and filter; the filtrate will be sulphocyanide of

potassium, which, upon being added to a solution of mercury, dissolved in nitric acid, gives a copious precipitate of sulphocyanide of mercury. Collect this, wash well with water, and dry; roll it out and cut into pieces of desired sizes and dry.

Sparklers.

Potassium nitrate in fine powder	14 parts.
Powdered sulphur	1 part.
Powdered charcoal	1 part.
Filings of iron	5 parts.

Mix and put in paper rolls of desired cross-section.

Dyeing Wool with Chrome Colours.

1203 M. M. & G. M., Katmandu—Desires to know recipes for dyeing wool in various colours.

In dyeing wool with chrome colours, i.e., anthracene colours the dyestuffs are dissolved by pouring boiling distilled water on them. When the dye is completely dissolved, charge the bath with 10 per cent. Glauber's salt and 1 to 4 per cent. sulphuric acid. Enter the wool at 60°—70°C (140°—160°F), raise to the boil within 20 minutes, and continue boiling for 1 to 1½ hour; cool off again to 60°—70°C, add the requisite quantity of bichromate of potash (about $\frac{2}{3}$ of the weight of the dyestuff used), and boil for another $\frac{1}{2}$ hour.

The above method is suitable for dyeing wool with the following colours:—Anthracene Chrome Blue, Anthracene Chrome Brown, Acid Brown G, Anthracene Yellow BN., Anthracene Acid Black SR, SAS, SBB, SA.

N.B.—Anthracene Chrome Brown D must not be dyed with more than 3 Vol. XXVI. No. 306.

per cent. sulphuric acid, whilst for Black up to 5 per cent. are required.

When dyeing with Anthracene chrome violet, Anthracene chrome blue, or any of the above mentioned Anthracene acid blacks in copper vessels or machines, the dyebath is first heated to about 60°C (140°F) and charged with $\frac{1}{4}$ to $\frac{1}{2}$ per cent. sulphocyanide of ammonia (of the weight of the wool); the liquor is then stirred well, or circulated in the machine, and after allowing to stand for 10-20 minutes, the dyestuff, acid, and Glauber's salt are added.

When the bath is exhausted it may be used over again for several lots, but in this case it is advisable to first boil the goods for 20-30 minutes in the old bath so that the goods may absorb the chrome still contained therein.

For imparting deep shades the same anthracene colours as employed for dyeing are usually applied, especially in the case of loose material; this is carried out by cooling the bath off a little, adding the well dissolved and diluted dyestuff, gradually heating again to the boil, and boiling for $\frac{1}{4}$ — $\frac{1}{2}$ hour. If considerable quantities of anthracene colours (more than $\frac{1}{4}$ th. of those used originally) are applied in the subsequent shading, they must be fixed by means of a little bichromate of potash in order to attain the best possible fastness to milling.

Embossing Powder.

1206 S. I. T., Madras—Wants to know a process of preparing embossing powder.

In embossing French chalk in fine powder is extensively used under various

trade names. It is prepared by finely grinding streatite or soapstone, a soft magnesium mineral possessing the property of writing on glass.

Sugar of Milk.

1232 U. B. U. C., Bally—Desires to know the process of preparing sugar of milk.

In preparing milk sugar nearly neutralise the acid of the whey with sodium or ammonium carbonate. Then boil when the coagulated albumen rises to the surface along with the fat, in the form of a porous scum. This is skimmed off and the liquid is evaporated slowly in a vacuum pan.

This impure milk sugar is sometimes dried and sold as such. More often it is refined into pure white sugar. For this purpose the crude milk sugar is dissolved in water at 50°C, with stirring in a steam heated copper boiler. The solution contains 24.27 per cent. milk sugar (13—15° Be). Animal charcoal and 2 per cent. of acetic acid is added (to precipitate albumen), the solution warmed nearly to the boiling point, some magnesium sulphate is added (to precipitate phosphoric acid), and the liquid is boiled for some minutes. The liquid foams. The temperature rises to 105°C. A sediment collects at the bottom. The liquid is pumped upwards (by a centrifugal pump) into a copper vessel covered with wood, and then allowed to flow downwards through filter presses.

The precipitate is rich in phosphorus and nitrogen and is a valuable manure. The clear liquid, of a yellowish tint, is concentrated in vacuum apparatus to 35° Be. Any foaming is stopped by

adding a little fat and increasing the pressure.

Finally the concentrated liquid is run into iron crystallising vessels, cooled, and the separated milk sugar is centrifuged. The mother liquors are worked for further crops of sugar. The milk sugar thus obtained is further refined by dissolving in water (to 15° Be), heated to boiling, aluminium sulphate is added, the liquid is filter pressed, concentrated to 32° Be, cooled in copper (not iron) crystallising vessels, centrifuged, and the resulting white sugar is dried in rotating inclined cylinders, in a stream of hot air, cooled, ground, and packed.

Liquid Gold.

1298 M. L. W. C., Arrah—Wishes to have a formula for preparing liquid gold.

Bleached shellac	6 oz.
Acetone	9 oz.
Gold Powder	4½ oz.

Mix. This paint may require a little thinning out, which may be effected by the addition of more acetone.

Tests for Ghee.

1622 N. R. R., Chandi—Wants to learn some simple tests for ghee and also the method of preserving it.

We give below two methods for testing the purity of ghee, which can be easily performed by a layman. These methods though rough, have been tried with good many samples of ghee and found to give fairly satisfactory results when pure ghee is adulterated with common impurities like vegetable ghee, talow, lard, or wax,

NITRIC ACID TEST.

This test is based on the fact that the nitro-compounds of fatty acids and their esters, formed by the action of nitric acid on pure ghee, are colourless, whereas those with vegetable ghee, tallow, or wax are coloured.

Boil some water in a small vessel. Take a little (about 3 c.c. or one-eighth full of tube) of the given specimen of ghee in a test tube and place it in the boiling water to melt it. Now pour 2 or 3 drops of pure and colourless nitric acid, and put the tube again in the boiling water for a few minutes. If the ghee is pure, its colour remains practically unchanged. If not, the liquid turns yellow, orange, or reddish-brown, depending upon the nature and amount of impurity. The vegetable ghee turns deep-yellow, tallow or lard orange, wax reddish-yellow. An intermediate colour is obtained when ghee is mixed with any of the above impurities. On standing the coloured liquid obtained with impure ghee solidifies more quickly than in the case of pure ghee.

SODA-ASH TEST.

This test is based on the fact that pure ghee is very slightly saponified by sodium carbonate, but wax is readily saponified and forms soap.

Dissolve some soda-ash in three times the quantity of hot water. Melt a little of the given samples of ghee in a test-tube as before, and pour about the same quantity of the soda-ash solution to it. Shake well and place the tube in boiling water for a few minutes. If the ghee is pure, the liquid become turbid due to fatty globules and practically no

soap is formed. On standing two separate layers are formed; the upper transparent layer consisting of molten ghee and lower one of the soda-ash solution. If, however, the ghee is impure, soap is formed by the combination of sodium carbonate with vegetable ghee, vegetable oil, tallow or lard. On standing the soap separates out in the form of a white (or yellow) layer, the lower layer consisting of excess of the soda ash solution. The amount of the soap formed depends upon the quantity of the impurities present.

This method can be employed for determining the amount of the impurities present in pure ghee. But so long as a layman knows that the given specimen of ghee is impure, he seldom cares to bother about the nature or quantitative estimation of impurities.

Preserving Ghee.

The bad, strong taste which so often develops in ghee is chiefly due to bad separation of the curd from the ghee. This curd is naturally a very acid substance, it decomposes and gives a bad flavour to the ghee. The greatest care should be taken to separate this rapidly from the ghee, and those portions which cannot be separated should be washed out with warm water. Very great care should be taken after the washing process is completed, to separate out the last drops of water. This can be done by keeping the ghee warm during the process of setting, and this should take 3 to 4 hours. The moisture gradually settle down and can be carefully run off through the stop-cock at the bottom of the conical shaped vessel. The ghee so

obtained will not turn rancid very shortly.

Boot Cream.

1657 M. C., Nagpur—Desires to know good recipes for preparing boot cream, etc.

White wax	3½ lbs.
Carnauba wax	1 lb.
Turpentine oil	16 fl. oz.
Water	160 fl. oz.
Curd soap	8 oz.

Melt the waxes over a water bath, add the turpentine oil on cooling. Boil the soap with water, add to other solution and stir or shake till cold.

This is a very good mixing to follow, where the manufacturer is desirous of producing several varieties of cream from one mixture. For preparing black, use ivory black, for tan, chrysoidine, for brown, phosphine, etc.

Liquid Insecticide.

Oil of pennyroyal	1 dram.
Oil of turpentine	8 oz.
Deodorised kerosene oil	
sufficient to produce	1 gallon.
Mix and put in bottles for use.	

Bindi Paste.

Carminé	15 parts.
Gum arabic	2 parts.
Bronze powder	1 part.

Macerate the first two ingredients with rose water in a stone mortar. Mix the bronze powder into the paste. Put up in a phial.

Bindi Stick.

Wax	1½ dr.
Almond oil	3 dr.

Carminé	6 grains.
Otto of rose	6 drops.

Melt the wax over a water bath then incorporate the oil. Now dissolve the carminé in just enough solution of ammonia, put in a warm mortar, and add the bases. Next remove from the water bath and incorporate the otto. When almost cool the mass is cast into moulds of desired length.

Preparation of Formaldehyde.

1288 M. J. M., Zanzibar—Desires to know the process of preparing formaldehyde.

The aqueous solution (35-40 per cent.) of formaldehyde is usually made by passing a mixture of methyl alcohol vapour and air, obtained by warming the methyl alcohol to 50°C and drawing a rapid stream to dry air through it over "contact" substances, such as platinum, coke, copper salts, unglazed porcelain, etc. maintained at a low red heat. The methyl alcohol is oxidised to aldehyde. The vapours pass into a number of condensing chambers arranged in series; in the first two chambers, which are empty, a 35-40 per cent. solution of formaldehyde otherwise known as "formaline" is deposited, which may be freed from a little unchanged methyl alcohol by distillation.

In the other condensers a very weak aqueous solution of formaldehyde collects which is ultimately brought up to the correct strength by a passage of the methyl alcohol vapour.

Essence of Pudina.

1066 S. A., Ghatkopar—Wants to know a process of preparing essence of pudina.

First extract the essential oil from pudina leaves by the method of distillation already described in detail under Perfumery. Then dissolve 100 parts of this essential oil in 1000 parts of alcohol

Magic Wire.

1233 S. T. K., Old Sukkur—Wishes to know the method of making magic wire.

In magic wire producing brilliant light, only magnesium wire is used. It does not contain any other metal. The magnesium wire is made by passing or re-passing the rod of magnesium through draw plate as used by goldsmith in making goldwire

Abir.

1289 B. G. N., Nagpur—Desires to learn the methods of manufacturing abir, stannous chloride, etc.

Abir is manufactured from the rhizome of Satti plant (*curcuma zedoaria*). The roots being dug up with the hoe, are thoroughly washed to remove all the adhering earth from their surface; they are then taken individually in the hand and deprived by a knife of every portion of their skins, while every unsound portion is cut away. This process must be performed with great care, otherwise the final product will be spoiled to a more or less extent. The skinned roots are thrown into a large cistern with a perforated bottom, and there exposed to the action of a copious cascade of pure water till this runs off quite unaltered. The cleansed roots are next put into the hopper of the mills, and are subjected to the powerful pressure of two pairs of

polished rollers of hard brass, the lower pair of rollers being set much close together than the upper. The starchy matter is thus ground into a pulp, which falls into the receiver placed beneath, and is thence transferred to large fixed copper cylinders, tinned inside, and perforated at the bottom with numerous minute orifices. Within these cylinders wooden paddles are made to revolve mechanically with great velocity, at the same time that a stream of water is admitted into them from above. The paddle-arms beat out the fecula from the fibres and the parenchyma of the pulp and discharge it in the form of a milk through the perforated bottom of the cylinder. This starchy water runs along pipes, and then through a strainer into large reservoirs, where after the fecula has subsided, the supernatant liquor is drawn off, and fresh water let on, the whole is agitated and left again to repose. The starchy material thus obtained is dried on trays in the sun and then the powder is mixed with a decoction of sappan-wood and alum. It may also be coloured with some aniline dye.

Stannous Chloride.

This salt is prepared by heating tin in a current of hydrochloric acid gas. It is also formed by dissolving granulated tin in concentrated hydrochloric acid, with the aid of a gentle application of heat. The operation usually conducted in copper vessels, as the two metals in contact induce voltaic currents which results in the more rapid solution of the tin. The liquid on being concentrated deposits crystals containing two molecules of water.

Manufacture of Papadam (Papar).

I.

Boil *chana* pulse until it is soft; strain away the water and bray to a paste. Add moong meal to make a hard mass. Knead thoroughly and incorporate the following spices; cassia leaves, capsicum, coriander seed, black pepper—baked and powdered—in suitable proportion. Knead again and make into a dough. Divide it into small bits and roll them out into thin circular cakes with oil. Spread them out on plantain leaves and pack when dry.

II.

Boil potatoes and peel when soft. Rasp them and mix in meal of large martar. Knead the mass into smooth soft dough. Divide it into small bits and roll them out with khesari meal. Spread out and pack when dry. The product will be very palatable and crisp. Potato papadams are much relished.

Essence of Peppermint.

1295 N. N. S., Jamnagar—Wants a recipe for preparing essence of peppermint.

Oil of peppermint 2 fl. oz.

Rectified spirit 16 fl. oz.

Dissolve the oil of peppermint in the spirit and put in a well stoppered bottle.

Mercerising Cotton.

1301 T. K. J., Sukkur—Desires to know the process of making mercerised cotton.

Mercerising of cotton consists in impregnating the fibres with concentrated caustic soda lye, either with or without the application of tension, and in stretching the material before and during the removal of the soda by means of washing. Mercerisation on cotton can be carried out either in the loose state or in the woven condition. Boiling out is of course the first step, although in occasional instances, when dealing with certain qualities of cloth, it is not resorted to. Hanks are boiled out under low pressure, while warps are passed through a boiling out machine. Both forms of yarn are occasionally dried up after washing, before being brought into contact with the mercerising liquor.

The principles involved in the control of the mercerising bath are the same for both yarns and cloths. They depend upon the temperature of the bath as well as upon its degree of concentration, and also upon the state of the material wet or dry. When employed at a strength from about 42° Tw. to 56° Tw., and used regularly and continuously at the same strength, the temperature of the bath should not be allowed to exceed 30°C. At low temperatures the strength may be relatively decreased within certain limits. Generally considered, the duration of contact of the alkali with the cotton is regarded only as a matter of secondary importance, excepting in certain systems of treating pieces, when the contact is allowed to continue for many hours. For most purposes a treatment extending over two to five minutes is considered sufficient to give the maximum of results.

After treatment with caustic soda the first washing is an operation as important as any, and should be accomplished while the material is still under tension. After this souring and washing follow, especially if the goods are then finished and are required for dyeing with any other colours than the substantive and sulphide dyestuffs.

After washing, the cotton is dried still in the stretched condition, mercerised yarns show an appreciably better lustre than when dried in the loose state. A course of stringing on specially constructed machines is also occasionally resorted to.

Removing Oil Stains from Cloths.

1320 H. P. T., Ghazipur—Wants to know processes of removing oil stains from cloth.

For removing oil stains from cloth first of all use 5 per cent solution of caustic soda. Work the stain for about 15 minutes at 140°F. The oil is saponified forming soap. On washing with hot water the stain is removed.

If you are unsuccessful with this, use 10 per cent solution of ammonia over the spot and rub gently for 10 minutes. Then wash with hot water.

READER'S BUSINESS PROBLEMS

[Reader's business problems will be discussed in these pages. We invite the reader to write us his difficulties. As the department is in charge of an experienced businessman who is specially adept in dealing with such problems and to whom experiences of a large number of successful business men are available, his replies will lead the enquirer to a successful career. These replies will be published in the paper only and cannot be communicated by post.]

Price and Profit.

1632 L. R. P. C., Lucknow—Writes how to fix prices of goods so that profit may be ensured.

To run successfully any business whether big or small, the manager must know his cost of the goods he deals in. Unless he knows the cost prices he will not be able to cope with any competition or to check the loss if there be any. Goods are bought at a certain rate but the invoice price and the transport charges are not all that the firm spends over them. When working out the cost price every trader must consider rent and taxes, charges over light, stationery, postage, paper string, repairs to premises and fillings, non-productive labour expenses of supervision, advertising, interest on capital used, bad debts, depreciation of stock, etc. These are all current charges that have to be met out of the price charged to the customers if the firm is to run successfully.

The question of cost charges is very important. In majority of cases the fault of a struggling business whose proprietors are striving unsuccessfully to make it pay, is that there is no proper appreciation of how much it is costing to run the business. If they look into it they will be surprised at the high percentage. Without profit, expansion and progress is impossible. In fact, if profits are too small, the business is likely soon to be

embarrassed for ready cash, for the reason that the overhead will eat up this small margin rapidly actually leaving the business at a standstill. When a business stands still, decay has set in and the end is in sight. Extreme business and a large volume do not necessarily indicate prosperity. Prosperity is gauged not by the volume done but rather by total net profits made.

Wheat & Cotton in Foreign Countries.

1744 D. L. K., Karachi—Wants to know the prospects of wheat and cotton crops in Foreign countries.

From the latest information available it appears that the condition of wheat crop in Europe was fairly satisfactory on the whole at the beginning of May. Except in the Mediterranean countries where there was insufficient rain, rainfall in the continent was normal in April and in some cases even above the average cold waves, accompanied by hoarfrost and sometimes even by heavy falls of snow, occurred in nearly all parts of Europe at the end of April and during the first decade of May; but owing to their short duration and the rains where followed, the damage to crops was limited to small proportions.

Weather during the first half of May became more or less fine except in the Mediterranean Sea where the much need-

ed rains were received rather too late. The low temperature which prevailed almost everywhere on the continent during the later part of April and the first three weeks of May delayed the growth of crops which are considerably backward when compared with the normal. Nevertheless the condition of the winter wheat crop in the middle of May in most countries, was considered to be as good as or better than that at the corresponding time last year. The condition of spring crop was, however, less satisfactory. Prospects of the new crop thus depend a great deal on the course of the season upto the time of harvest. Fine weather with a gradual rise in temperature is necessary to assure good yields in most of the European regions.

In Egypt sowing of cotton was completed in April. The germination and the growth were, however, unsatisfactory owing to variable weather during the first half of the month which led to the prevalence of thrips in many areas in all provinces, especially in the northern districts and in Fayum. Consequently, many plants dried up, necessitating re-sowing to the extent of 50 per cent. in certain fields, while others had to be entirely resown. The improvement of the weather conditions during the latter half of April and the rise in temperature during the last week of the month, however, promoted the growth and counteracted the effects of the attack by the thrips. According to market information, the area planted in lower Egypt is practically the same as that of last year while in Upper Egypt a small increase is reported.

To Get More Customers.

1798 G. E. C., Calcutta.—Writes, "I am a dealer in electric goods carrying on business here. I have got a fair number of purchasers, but I feel that their number can be considerably increased. What am I to do to increase the number of my customers?"

This is a very interesting question, a correct reply to which is bound to be instructive, not only to you, but to the entire body of dealers and businessmen anxious to increase the patronage of customers. In these days of competition, unless you take special care to increase their number, the chances are that the number of your actual customers will gradually dwindle away and be absorbed in the establishments run by your rivals. There is no such thing as remaining stationary in life, certainly not in business. If you cannot advance, you must recede. This is the universal law and you cannot expect to be exception.

To increase the number of your present customers, you must so conduct yourself that not a single individual who may come to your shop for buying anything may ever have the slightest occasion to take any umbrage at your behaviour. This does not mean that you should be a sycophant of your customer. Far from it. That will only serve to repel your customers. You must train yourself to find out exactly what the customer requires and forthwith serve him with the minimum of delay. If he is known customer you must take care to let him know that you have not forgotten him. If the interval between his last coming and the present one happens to be long you might politely ask him

the reason why. In a word, you must try to win, not only his custom, but also his good will.

You must always avoid making over-statements about the quality of your goods if you want your customer to return to your shop for future purchases. It is much better that you under-state than over-state in these cases.

If you employ salesmen to represent you in different area, take care to see that such areas are not too big for one individual. He is almost sure to do better work by confining his activities to a narrower area than by trying to capture all the available purchases of a much bigger sphere. If possible, try to provide your salesmen with charts showing the buying power of the area he will be entrusted with. It will be a good plan to ask your salesmen to prepare such charts. To be brief, you must have an idea of the amount of sale it might be possible for a salesman to effect within his jurisdiction, as compared with what he actually succeeds in selling.

Then again, there must be an intensive man-to-man search for buyers, which can only be successfully done by your salesmen and canvassers. Seated in your shop you the owner can devote your attention to improving your window display more effectively. Your satisfied customers will also help you considerably by introducing new batches of customers, if you always treat them with due regard and consideration, which means and includes that you should (1) study your customers' wishes, (2) study their complaints and convenience, (3) try to increase sales to customers, (4) try to bring back lost customers.

It is not a bad plan, as some firms are now doing, to send lists of questions to customers or to have canvassers go from door to door to find out the wants and opinion of customers.

As for increasing the number of your actual customers by advertisements it is too big a subject to be dealt with in these columns.

Business of a Shipping Agent.

1783 R. L. D. D., Karachi—Requests us to discuss the prospects and duties of a shipping agent.

As the shipping business expands more and more, there will be increasing scope for our young men to take up the occupation of shipping agents. But it must be remarked here that the agency business requires a thorough acquaintance with the shipping trade and an up-to-date knowledge of shipping techniques. In his capacity as a local representative or agent of the shipper, he must be competent to protect the interests of his principal by all means and even on some occasions he will be asked to guide him in many respects. He has also to exercise great care when questions of damage, average, liens, arrestments, etc. are involved. Moreover an agent must also possess at his command a training staff to work out the details and to look after the handling of a steamer whilst in port.

The first duty of a shipping agent to be performed on learning of the impending arrival of a steamer consigned to his care, is that he should set about making the requisite forward arrangements against the steamer's arrival. The agent should next issue notices of readiness to the receivers intimating them that the vessels are in port ready for discharging. He should also in the same manner send notices of readiness to the broker of freights meaning that the steamer is in every respect ready to commence loading. The agent is also required to keep a careful watch on the progress of discharge and see that the requirements of the contract with regard to both time for discharging and payment of freight are carried out. If the freights and other charges are in default, the agent can exercise lien on the cargo. In such cases legal assistance may be called in. It is also the concern of the agent to realise all demurrage charges on behalf of the owners whenever any falls due.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of Industry are invited. Enquiries or replies from our experts will be published free of charge. Questions are replied by post on receipt of As. 4 stamps of small value only for each question. In order to facilitate the work of Editor's Department and to help prompt action the readers are requested to send enquiries in separate letters.]

1676 B. S. C. B., Vizianagram City—(1) Rice milling machines may be supplied by Huntley Mfg. Co., Silver Creek, New York, U. S. A.; and Imahishi & Co. Ltd., 12, Tsuigo-mecho, Konohanaku, Osaka, Japan (2) For polishing rice shelled and winnowed rice is conveyed to the cone huller where the mealy cuticle is removed from around the kernel of the rice grain, and from which it emerges clean and white. In this machine the scouring is effected between an emery covered cone carried on a vertical spindle revolving inside a casing of stout wire cloth. The rice is fed into the annular space between the cone and the casing and by the time it reaches the bottom much of its covering has been scoured off and has passed through the meshes of the wire cloth in the form of meal. (3) For removing small stones from rice you may use a sieve. (4) We are not aware of any such automatic machine. (5) You may however write to Krupp India Trading Co. Ltd., 29, Strand Road and Marshall Sons & Co. Ltd., 99, Clive Street; both of Calcutta. (6) An article on fire brick manufacture appeared in May 1934 issue of Industry.

1677 A. R. C., Nellore—(1) Ice making machines may be had of M. S. Vernal & Co., Bharat Insurance Bldgs., Chittaranjan Avenue, Calcutta and Massey & Co. Ltd., Post Box No. 60, Madras. (2) During the excessive heat of the summer in the mofussils, where ice is not available certain freezing mixtures may be used to cool drinking water. The chemicals in this case should not be put into the water but outside, surrounding the vessel containing the water to be cooled. When the chemicals are dissolved in water, a considerable fall in tem-

perature results. Following is a recipe of freezing mixture: Ammonium nitrate 2 lbs; water 2 pints.

1679 S. R. G., Subathu—(1) For learning poultry farming you may write to Govt. Experimental Poultry Farm, Etah. (2) In soap manufacture you may use mohua oil in place of tallow.

1680 H. M. A., Bhusawal—Watches may be supplied by Porzellanfabrik Cortendorf Julius Griesbach G. m. b. H., Cortendorf near Coburg, Germany; Muller-Schlenker A—G, Schwenningen a. N. Germany; Fukusei Yoko, 16, Uchi Humachi, Hashizumecho, Higashi-ku, Osaka, Japan and H. Ishihara Shoten, 45, Shinsaihashi-suji 1-Chome, Minami-ku, Osaka, Japan.

1684 S. N. C. B., Palghat—There is no permanent remedy for a wornout record; some preparations are sold to rub over the surface, and which do reduce the hissing and scratching noise, but like most wornout things it will finally have to be scrapped. Modern records last practically a lifetime provided they are given fair treatment. The following recipe will, however, give a fair result: Gasoline 2 parts; kerosine 1 part, Mix together. Give it a reddish tint with alkanet root by allowing it to stand in the mixture for a few days to reach the desired colour. Shake frequently during this period. In order to get rid of the bad odour of the kerosine add any strong scent.

1685 H. S. Pusa—(1) In these days of unemployment it is advisable for you to start a business. But before actually launching upon the business you should first select the site and study the market there, so it is advisable for you to go over to Delhi and enquire where

Machinery for the Manufacture of

Chemicals, Powder, Hair Oils, Creams, Perfumes, Pills, Tablets, Drugs, Medicines,
Artificial Ghee, etc. Also:—

Chemical Plant, Oil Mills, Filter Presses, Sugar Mills & Centrifugals, Tin Box Making Machinery, Sterilisers, Laboratory Apparatus, Biscuit and Bread Making Machinery, Laundry Machinery, Tube-filling Machinery, Winnowing Machinery, Threshing Machinery, Fruit Preserving Machinery, Water Softening Plant, Slate and Stone Working Machinery and Pumps for all purposes.

W. J. ALCOCK & CO., 7, Hastings Street, Calcutta. Saroup & Bansilal, 57, The Mall, Lahore. Agent for Bareilly District KODESIA ENGINEERING CO., Naini Tal Road, Bareilly.

the wholesale market is situated. Take quotation from them and compare with the prices quoted by Bombay and Calcutta merchants. If you are really earnest in starting a shop just go to Delhi and select the sight. (2) Following is a list of provision and kirana merchants Durga Pershad Udmi Ram, Ishwar Bhavan; Murlī Dhar Charanjī Lal, Ishwar Bhawan and Hazari Mall, Ghasi Ram, Katra Paira; all of Delhi (3) Coal may be had of Lahore Coal Co., Paharganj, Delhi; Britania Coal Co., Panchkuin Road, Delhi and Raj Krishen Prem Chandra Jain, Ajmere Gate, Delhi. (4) In fixing price you should always remember that your price should never be higher than the prices quoted by other dealers.

1686 H. A., Shikarpur—Process of manufacturing sulphonated olive oil will appear in an early issue of Industry.

1688 E. T. C., Scremban—Following is a formula of liquid dressing for canvas shoes: Water 3 gallons; pipe clay 10 lbs shellac 3 lbs.; borax 1½ lbs; Soft soap 3 oz.; ultramarine 2 oz Pipe clay and borax should be powdered and the shellac bleached Boil shellac and borax in the water until dissolved; stir in soft soap, pipe clay and blue. Mix well and strain

1689 K, C R., Guntur—You may use ghanny for extracting oil which may be had of Machinery Supplying Agency, 40, Strand Road, Calcutta and W. J. Alcock & Co., 7, Hastings Street, Calcutta.

1690 P. T. C., T. Anson—Wants to be put in touch with the firms who can supply photos embossed on tops set on marble or mahogany and rosewood,

1691 P. B R., Mangalagiri—(1) Saffron musk and assafoetida may be had of Kashmir & Tibet Trading Co., Srinagar, Kashmir and Baru Ram Bhagria, Ludhuana. (2) Wants to be put in touch with the suppliers of Patchakar-puram,

1692 R. S. W., Dacca—If you follow the instructions given in the book you will be able to manufacture disinfectant fluid. Creosote may be had of Bengal Chemical & Pharmaceutical Works Ltd., 31, Chittaranjan Avenue, Calcutta.

1694 S. X., Coimbatore—(1) For Japanese directory write to Indo-Japanese Commercial

Museum, 135, Canning Street, Calcutta. (2) Glassware may be supplied by Fukuji Shoten, 23, Kajiyamachi, Minami-ku, Osaka, Japan and R Fukushima, Shaki, Andojibashi Bldg., 44, Andojbashi-dori, 1-Chome, Minami-ku, Osaka, Japan (3) Perfumes, may be supplied by Fukudagen & Co., 41, Shinmachi Minamidori 3 Chome, Nishuka, Osaka, Japan and Momotani Juntanken Ltd, 5, Ichuoka Motomachi 5 chome Minato-ku, Osaka, Japan.

1698 N. H. P., Khanewad—Collapsible tubes may be had of Shah & Co., 55, Ezra Street, Calcutta

1700 K. A. N. C., Colombo—(1) Manufacture of matches will be profitable if you import match splints and vineers from Japan. You may also manufacture matches with the help of Indian machines which may be had of H. R. Brothers & Co., 81/A/C, Bechu Chatterjee Street and Bhowani Engineering & Trading Co. Ltd, 56, Gouribari Lane; both of Calcutta. The above firms will supply you with an estimate for starting a factory showing approximate net profit in the industry. Match making chemicals may be had of Ganguli Bros. & Co., 16, Bonfields Lane, Calcutta and Pragjee Bros, 37, Canning Street, -Calcutta. (2) You may take up manufacture of candle and soap on a small scale You need not use any machine for the above industries. Only mould for candle and stamps for soap will do in the beginning. These two industries seem to fetch good profit. You need not import chemicals and paraffin from foreign countries rather try the local dealers. (3) It will not be profitable to manufacture cigarettes on a small scale. For cigarette making machine write to T. V. Lynn & Co, 58, Forbes Street, Fort, Bombay. For manufacturing good cigarettes you have to use virginia tobacco with tobacco locally grown.

1701 H. N. G., Berhampore—For learning wireless telegraphy you may write to George Telegraph Training Institute, 136, Bow Bazar Street, Calcutta, and City Telegraph and Commercial College, 121B, Bow Bazar Street, Calcutta There is no such institute where training regarding steamship is given.

1703 A. L. S., Sadri—(1) Small cinema machines may be had of J. F. Madan & Co.

— ESTABLISHED 1917 —

GANN BROTHERS, TOPALL WORKS, LUCKNOW.

THE ONLY SUPPLIERS IN INDIA OF

COMPOSITION CORKS FOR FOUNTAIN PEN INK POTS, BOOT CREAM BOTTLES, MEDICINAL AND FOR HAIR OIL PHIALS COMPOSITION POTS FOR OINTMENTS, POWDERS, POMADES, ROUGE, SINDUR, SNUFF, ETC

Branches : 153/1, RADHABAZAR STREET, CALCUTTA. 3, CHUNAM LANE, BOMBAY, 7.



Ltd., 5, Dharamtala Street, Calcutta. (2) Watches may be had of Modorina Watch Co., Hornby Road, Fort, Bombay, and West End Watch Co., 40, Esplanade Road, Bombay.

1706 O. M. S., Bahrain—Process of extracting fibre will appear in an early issue of Industry.

1708 S. -L, Agra Cantt—For books on brick and tile manufacture write to D. B. Taraporevala Sons & Co., Kitab Mahal, Hornby Road, Bombay. As far as we know no firm making bricks and tiles takes apprentice. You may however communicate with them direct offering your service.

1713 A. M., Multan City—(1) You may try to secure loan from any local party doing the business of money lending. (2) We are not aware of any reliable service securing agent. (3) Instead of trying for a service you may try to improve your business. In these days of unemployment it is very difficult to secure a remunerative job. (4) To improve your business you should first of all stop doing work on credit. You may also open tailoring business along with cut piece business. Behave with your customers politely and try to increase the number of acquaintances by every means. If you sell on credit at all present the bill during the first week of every month so that the customers may pay the bill on receiving their monthly salaries. You may qualify yourself as an accountant but not an engineer. That line will not suit you.

1714 T. K., Peradeniya—(1) For dye you may enquire of Haverro Trading Co., 15, Clive Street, Calcutta. (2) For redyeing the cloth first bleach the cloth so that no stains remain. (3) Wash the cloth with sodium thiosulphate solution for removing plantain juice stain.

1716 M. A. C., Gorakhpur—(1) Vaseline the sample of which you have sent require further refining. Process of refining vaseline will be found in August 1934 issue of Industry. (2) Tablet making machines may be had of Dr.

Bose's Laboratories Ltd., 45, Amherst Street, Calcutta and W. J. Alcock & Co., 7, Hastings Street, Calcutta. (3) A good formula of snow cream will be found in June 1934 issue of Industry.

1717 M. F., Jharsuguda—(1) Formulas of hair cream appear elsewhere in this issue. (2) For deodorising oil you may pass steam through it. (3) For engraving name on fountain pens you have to use a machine which may be had of B. M. Sarine & Co., Lakhmandas Bldg., Mangaldas Road, Kalbadevi, Bombay. (4) A good recipe of scented coconut oil will be found in November 1934 issue of Industry. (5) Melt rosin 1 oz., in an iron vessel, let cool a little and add sufficient oil of turpentine to keep it liquid. When cold, add colours and mix. (6) It is not possible to make white catechu from black catechu, however you may mix chinaclay with catechu solution and dry. (7) Lens is made by grinding which process will be found in Independent Careers for the Young published from this Office. (8) Hindi equivalent of the chemical is not available. (9) Can supply cow bones. (10) Process of scent and perfume manufacture appears elsewhere in this issue. (11) For sand blasting write to W. J. Alcock & Co., 7, Hastings Street, Calcutta. (12) It is not possible to make camera without lens. (13) For borrowing book you may write to the Librarian, Commercial Library, 1, Council House Street, Calcutta. (14) Process of synthetic fruit essences will be found in July 1935 issue of Industry. (15) There are many firms in India which sell goods on instalment system. (16) It is not possible to remove hair permanently. (17) A formula of battery solution will be found in August 1935 issue of Industry.

1719 R. M. S., Baroda—Following is a process of making fly papers: Simple syrup 100 parts; honey 30 parts; extract of quassia wood 4 parts; oil of aniseed a few drops. First prepare the simple syrup by boiling 2 parts of sugar in 3 parts of water. Then prepare the extract of quassia by boiling 7 lbs. of quassia with successive portions of water until exhausted. Concentrate to 1 gallon. Now mix the two and the other ingredients. Lastly, dip unsized brown paper in this; dry and cut into stripes.

1720 S. A. H., Tanganyika—(1) An article on rubber stamp making appeared in June 1934 issue of Industry. If you go through the article you will get all the information you require. For practical training in rubber stamp making you should try to be an apprentice in a rubber stamp making concern. (2) For learning dentistry by correspondence write to City Dental College, 7, Upper Chitpore Road, Calcutta.

GOLDEN OPPORTUNITY.

To all cotton merchants, exporters, consumers, in India and abroad, to entrust any kind of work such as Surveys, Arbitration dispute, Claims, Sales and Purchases in Bombay Markets, and Africa, Egypt, American centres, Foreign Exports and Imports, transit and despatch, reliable market opinion and telegraphic information. Write to K. B. KOTAK, Lalit Block, Ville Parle, (India)—35 years expert in the line a Surveyor and Arbitrator of the East India Cotton Assn., and adviser in all kinds of business such as Gold, Silver, Seeds, Wheat and Sundries.

1721 B. J. P. J., Raigarh—Typewriter machines may be had of Remington Rand Inc., 3, Council House Street, Calcutta and Blackwood Blackwood & Co., 4, Lyons Range, Calcutta.

1725 V. S., Chirala—(1) Process of making incense sticks will be found in December 1934 issue of Industry. (2) Process of manufacturing envelopes and fountain pen ink will be found in August 1934 issue of Industry. (3) A good recipe of Office paste will be found in February 1935 issue of Industry. (4) For filtering ink you may use filter press.

1727 W. I. W., St Thomas' Mount—Fancy bottles may be had of Shah & Co., 55, Ezra Street and Sikri Bottle Store, 14, Ezra Street; both of Calcutta.

1729 B. L. N., Madras—(1) Gold and silver leaf making machine is not available, (2) No machine is required for making biris. (3) For charka write to Khadi Pratisthan, Sodepur, 24 Perganas, Bengal. (4) Can supply cashew shells and shellac.

1730 S. H. K. L., Ahmedabad—(1) Chemicals you require may be had of Gangulee Bros. & Co., 16, Bonfields Lane, Calcutta (2) For resorcin blue write to Adamjee Bhaijee Rangwala, 396, Katha Bazar, Bombay and Kobbar & Co. Ltd., 124, Cowasji Patel Street, Bombay. (3) Beeswax may be had of Banshidhar Dutt & Sons, 126, Krengrapaty, Barrabazar, Calcutta. (4) Gujarati equivalents of the ingredients are not available.

1734 L. C., Waltair—(1) Printed tin cans may be supplied by S. A. Torab & Co., 55, Canning Street, Calcutta; Marui Sakujiro Shoten, 10, Andojibashidori, 4-Chome Minami-ku, Osaka, Japan and Nakane Kojo 381, Noecho 2-Chome, Higashinari-Ku, Osaka, Japan. (2) Glass bottles may be had of Tokunaga Glass Manufacturing Co., Ltd., 8, Yorukimachi 2-Chome, Kitaku, Osaka, Japan. (3) Pill making machines may be had of Dr. Bose's Laboratories Ltd., 45, Amherst Street, Calcutta.

1735 B. B. P., Mandvi—Refer your query to the Consul-General for Japan, 26-27, Dalhousie Square, Calcutta.

1738 K. N. I., Quilon—Lemon grass oil is used in perfuming cheap toilet soaps. It is very difficult on our part to suggest names of parties in Germany and England who will buy lemon grass oil from you. You better write to the Indian Trade Commissioner, India House, Aldwych, London W. C. 1.

1739 C.I.S.T.C., Indore—You can start a number of industries with Rs 2,000. But before starting any industry you should discuss yourself about the pros and cons of the particular industry as regards local influences, raw materials available, labour, facility for selling the products, etc. In my opinion hosiery manufacture will be more profitable than envelope manufacture. There is still large demand for hosiery goods in India whereas envelope making is limited among few workers. You may also start a washing soap factory with Rs. 2,000.

1741 P. S. N., Hebri—(1) Cinnamon oil is extracted by the process of distillation. Copper distillery with perforated false bottoms to hold the raw materials is connected with condenser to have the steam charged with essential oil condensed. The steam generated passes through the bruised and powdered cinnamon on the perforated false bottoms and charged with the essential oil passes into the condenser where it is condensed into water and essential oil. The condensed liquid is allowed to fall into a glass Florentine flask when the excess of water passes out into bottles through one tube and the essential oil through another tube. The oil is further clarified by filtering. Up-to-date distillation plant may be had of The American Copper and Brass Works, 612F, Front Street, Cincinnati, Ohio, U.S.A. For an estimate for starting a factory write to the party direct. (2) You may take agency of safety matches but I think you have to deposit security for the good, you will take.

BATLIBOI'S MACHINERY

Diesel Engines, Flour Mills, Rice Mills, Dal Mills, Generating Sets, Pumping Sets, Hand and Power Pumps. Workshop Machinery, Printing, Paper Cutting, Book Binding Machinery, Braids and Ribbon Making, Soap Making, Electric Motors, Generators, Electric Tools, Welding Plants, Flexible Shafts, Plating Machinery and Materials, and every type of Woodworking and other Industrial Machinery.

BATLIBOI & COMPANY, Engineers,

Forbes St., Fort, Bombay and 4/153, Broadway, Madras.

1742 C. B. K., Calcutta—Collapsible tubes may be had of Compagnia Italiana Tubi Metallici Flessibili, Via-Cervini 50, Torino; Ulisse Venturi, Via Nazario Sauro 140, Pistola and On Instituto Nazionale per l'Esportazione, Via-Torino 107, Roma; all of Italy.

1748 S. P. T., Dera Ismail Khan—Though stamps collecting is not recognised as a money making avocation by the people of our country the Westerners have understood its importance long ago and there are a number of public and private companies formed over there solely for doing business in this particular line. You may write to Calcutta Philatelic Co., 1, Lindsay Street, Calcutta for selling used postage stamps.

1749 G. M. L. S., Fatehgarh—You may consult Indian States Register and Directory by A. N. Sundarisanam published by Indian States Register & Directory Office, Egmore, Madras.

1752 C. I. M. C., Mulund—Bengal matches are made by dipping the splint in a composition prepared by mixing 6 parts of barium nitrate and three parts of potash chlorate in required quantity of lac solution prepared by dissolving one part of lac in three parts of methylated spirit. The tip of the dipped splint is then dipped in safety match head composition. The sides of boxes are painted with safety match surface composition.

1753 N. K. R., Bezwada—Process of preparing malted food will appear in an early issue of Industry.

1756 S. V. R., Vizagapatam—(1) To detect presence of chlorine in kerosine oil take a little quantity of the oil and add a few drops of silver nitrate to it. If white precipitate settles at the bottom it indicates presence of chlorine in the oil. (2) Chlorinated lime is bleaching powder. Process of manufacturing bleaching powder will be found in December, 1934, issue of Industry.

S. H. Kelkar & Co.



36, Mangaldas Road,
Bombay No. 2.
Wholesale Importers and
Stockists of

Essential Oils, Aromatic
Chemicals, Synthetic Per-
fumes, Flower Ottos, Soap
Perfumes, Oil colours and
all sorts of Perfumery Raw
Materials required for Per-
fumes Soap Makers, Agar-
bathi Manufacturers, etc.,
etc.

Prices and other Particulars
on Application.

1758 A. I. P. M. A., Tirumalai—You may open business in fancy goods and other novelties. You should always remember that you will be the first man to introduce the new goods in the local market. If you proceed in this way your goods will be sold, like hot cakes. But you cannot do this business on commission basis like agency business. For securing advertisement you should write direct to the parties offering your services and business terms. We fear no Japanese firms will supply you goods on commission basis like agency business. For fancy goods write to Perialwar Chetty, & Co., Esplanade, Bombay; Padma & Bros, Triplicane, Madras and P. Simon & Co., 23 & 24, Errabalu Chetty Street, Madras.

1759 F. E. P., Bombay—You may write to Universal Mutual Benefit Co., 1009, Panch Kuin Road, New Delhi for ice cream machine parts.

1760 B. D., Quetta—Following is a list of jam and jelly manufacturers: Sreekissen Dutt & Co., 33/2, Middle Road, Entally, Calcutta; Indian Delicacies Manufacturing House, Egerton Road, Delhi; Hafiz Shahabuddin, Gati Bata-sha, Khari Baoli, Delhi and Bengal Canning and Condiment Works Ltd., 3, Gurudas Dutt's Garden Lane, Calcutta.

1761 N. I. C. C., Ferozabad—Process of preparing nitrate of silver will appear in an early issue of Industry.

1762 S. N. G., Etah—For training in cinema and film industry write to the Principal, Cinema College & Radio Hospital, 33A, Shyamananda Road, Calcutta.

1767 S. M., Cumbum—(1) For silvergilt powder write to S. Mitra & Co., 210, Girgaum Road, Bombay. (2) Wants to be put in touch with the suppliers of barytes and gun metal.

1769 I. B. S., Cawnpore—You may refer your query to The Indian Trade Commissioner, India House, Aldwych, London W. C.

1771 T. L. G., Dera Ghazi Khan—(1) No such book is available. (2) For books on printing write to W. Newman & Co., Ltd., 3 & 4, Old Court House Street, Calcutta.

1773 K. S., Montgomery—(1) You may consult The Manufacture of Paper by R. W. Sindall to be had of Thacker Spink & Co. (1931) Ltd., 3, Esplanade East, Calcutta. (2) Paper making machines may be had of West End Engineering Works Co., Edinburgh 11, and J. & E. Arnfield Ltd., Globe Engineering Works, New Mills, near Stockport. (3) It is not possible to manufacture washing soda without machinery. (4) Process of manufacturing sodium carbonate will be found in Chemical Industries of India published from this Office. (5) Ammonium sulphate may be had of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta. (6) Ammonia may be prepared by heating together in a glass

flask dried quick-lime and ammonium chloride. The gas so obtained is ammonia. To get a solution, pass the ammonia gas into water by means of a rubber tube, one end of which is connected with the mouth of the flask while its other end with the stem of a funnel, which is placed inverted into the water such that the gas which is highly soluble may not suck up the water into the distilling flask. (7) The solubility of a substance in water increases with the rise of temperature, hence it is very difficult for us to state exactly the amount of salt to be dissolved in water to make it saturated unless the temperature is known. (8) Wants services of a chemist for manufacturing soda ash.

1775 S. K., Lahore—Process of making book binding cloth will appear in an early issue of Industry.

1776 S. S. S., Lahore—Process of manufacturing all kinds of toilet articles appears elsewhere in this issue.

1777 H. G., Bombay—An exhaustive article on rubber industry, appeared in December, 1934, issue of Industry. If you go through the article you will get all the information regarding rubber shoe making. You may consult The Manufacture of Rubber Goods by A. Heil & Dr. W. Esch and Gottlob's Technology of Rubber by J. L. Rosenbaum. Following is a list of rubber factories: India Rubber Goods Manufacturing Co, 47, Muraripukur Lane, Manicktala, Calcutta; Calcutta Rubber Works, 1, Sura East Road, Belegghata, Calcutta, and United Rubber Works, Tiljala Road, Calcutta.

1778 G. E. T. C., Bombay—(1) Different carbolic coefficients are obtained by the variation of creosote added. To get the coefficients analyse the fluid. (2) Following is a recipe of paint remover: Paraffin wax 1½ lbs. rosin 1½ lbs. acetone, 2 pints; amylacetate 4 fl. oz.; carbon disulphide 1 pint; mineral naphtha 1 gal; methylated spirit 1 gal. Melt the wax, stir in naphtha gradually; dissolve rosin in alcohol and add the other three ingredients. Now mix the two solutions.

1780 G. C., Madras—For yarn write to Gokuldas Damodar, 85, Cross Street; and Indian Yarn Trading Co. Ltd., 137, Cotton Street; both of Calcutta.

1781 M. A. B., Delhi—For books on enamelling write to Chakravorty, Chatterji & Co. Ltd., 15, College Square, Calcutta.

1787 M. J. V., Colombo—Following is a list of calendar and picture printers: Calcutta Chromotype Ltd., 52/3, Bow Bazar Street; Calcutta Printing Co Ltd, 76, Dharamtala Street; New Popular Press, 57, Simla Street; and Pearl Calendar Mfg. Co., Post Box 5777; all of Calcutta.

1788 M. J. M. C., Zanzibar—(1) Olive oil soap is known as green soap. (2) For ammonia and ammonia water preparation see under No. 1773. (3) For obtaining tincture of green soap dissolve it in alcohol. (4) Process of preparing formaldehyde solution appears elsewhere in this issue. (5) For moulds write to Ray's Industries, 33, Kankurgachi 2nd Lane, Calcutta. (6) Wants to be put in touch with the suppliers of base materials.

1792 X. X. X., Hyderabad—For detail information on Mohwra flowers you may write Mr. D. L. Sahasrabudhe M. Sc., M. Ag., Poona Agricultural College, Poona. We are not aware of any such book.

1793 G. W., Rawalpindi—For commercial and industrial books write to Kamala Book Depot. Ltd, 15, College Square, Calcutta; Thacker Spink & Co, (1931) Ltd, 3, Esplanade East, Calcutta, and D. B. Taraporevala Sons & Co, Taj Building, Hornby Road, Bombay.

1794 J. K. K. I., Madura—Process of separating ricinolic acid will appear in an early issue of Industry.

1796 M. M. J., Hardwar—Process of refining til oil and sarsoon oil will be found in Vegetable Oil Industry published from this Office.

1797 P. N. R., Srinagar—You will find addresses of all merchants in Industry Year Book & Directory published from this Office. In the meantime you may correspond with D. N. Bhat-tacharjee & Sons, 33, Canning Street, Calcutta for perfumes and soaps. For paint write to



Manufacturing specialities in spare time. No experience or capital required. Write for details (enclosing stamp if possible) to—
LEAGUE OF PROSPERITY PLANNERS,
2B, Bela Road, Delhi



SAPAT LOTION

MEANS

A radical cure for RING-
WORM and all sorts of
Skin diseases.

Price 1 oz. As 0-6-0
" 4 oz. Rs. 1-4-0

Postage Extra

SAPAT & CO., (I),
Bombay 2.

Abinash Chandra Dutt, 23-2, Dharamtala Street, Calcutta, and Barry & Co., 2, Fairlie Place, Calcutta. For metal write to Anandji Haridas & Co., Ltd, Meerbohur Ghat, Lohapatty, Barra-bazar, Calcutta and Standard Metal Trading Co., 77, Clive Street, Calcutta.

1802 H. C. G., Moradabad—(1) Alcohol may be derived from molasses. You may therefore sell your molasses to distilleries, a few addresses of which are given below. Please negotiate with them direct: A. N. Malik & Son, P. O Solon, Brewery, Simla Hills; Amritsar Distillery, Anvarganj, Cawnpore. The detailed list may be found in Industry Year Book and Directory. (2) Vinegar may be made from molasses; see also the article utilisation of Molasses, August issue. (3) The following is a list radio companies:—The Bombay Radio Co. Ltd, 73-5, Queen's Road, Bombay 2; International Radio Co., Commisariat Bldg., Hornby Road, Bombay; Mono Radio Ltd., P3 Central Avenue, Calcutta; Radio Supply Stores Ltd., 8, Dalhousie Square, Calcutta.

1803 K. L. G., Ambala Cantt—The process of manufacturing chalk crayons appeared in July 1934 issue of Industry.

1804 R. H. D., Poona City—Cigarette making machinery cannot be obtained for 500 rupees, A lac of rupees is required for such a plant. The machinery may be supplied by T. V. Lynn & Co, 58, Forbes Street, Fort, Bombay.

1808 P. L. S., Delhi—With a capital of Rs 1000 you can undertake the following industries which will yield at least Rs. 50/- per month if not more: Washing soap; liquid disinfectant commonly known as phenyle; Perfumery including hair oil, handkerchief essences, snow, cream, pomade; tooth powder and tooth paste; ink, confectionery, hand weaving, patent medicines, etc. etc.

1813 P. S. P., Ahmedabad—(1) Liquor Ferri Perchloride is the 25 % solution of ferric chloride. You can reduce it to 10 % solution by adding to it 1½ parts. water by weight. Liquor Ferri Perchloride may be had of Messrs B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta, or any other Pharmacy. (2)

Indigotin may be had of Messrs Fuzle Husain & Bros., 44, Armenian Street, Calcutta.

(3) For preparations of different kinds of ink consult Manufacture of Inks published from this Office. (4) The bad smell of an Indian ink is due to decomposition which may be prevented by adding .1 % carbolic acid. (5) The formula of Amla hair oil will be found in June 1933 issue of Industry.

1816 U. A. P., Toungoo—(1) Hairclip sharpening machine may be had of W, Leslie & Co., 19, Chowringhee Road, Calcutta. (2) Enamel printing tin cans may be supplied by Metal Box Co. of India Ltd., B 2 Hide Road, Kidderpore, Calcutta.

1817 M. S. Nandarad—Green root of creeper can be preserved by drying, or coating with wax. In alcohol it will preserve long but alcohol soluble active principles of the root will come out in this treatment.

1818 I. P. Patna—Addresses of American hotels are not known. Please enquire of Consul General for U. S. A. 9, Esplanade Mansions, Calcutta. Wants to be put in touch with buyers of Sitna meat and dried frogs.

1819 H. P., Patna—Same as 1818.

1822 V. & C., Murree Hills—Waterproof renewing composition will appear in an early issue of Industry.

1823 D. N. S., Jammu Tawi—Sound Recording may be learned from Radio Talkie Institute, 249B, Bowbazar Street, Calcutta.

1824 G. H. H. P., Virarajendrapet—The types may be had of Standard Type Foundry, 10, Wall Tax Road, P. T. Madras. Other enquiries will appear in an early issue of Industry.

1825 K. L. B., Daska—Following is the process of preparing rubber solution:—Absolute alcohol 6 parts, carbon disulphide 100 parts, caoutchouc a sufficiency. Mix the alcohol and carbon disulphide; then add sufficient quantity of caoutchouc to form solution of desired consistency. The quantity of the solvents required depends upon the consistency of the solution required; if moderate heat is used and the mixture is shaken, the whole dissolves very soon, but a better solution is obtained by

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IN EVERY SIZE & THICKNESS
WHOLESALE & RETAIL
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& SAMPLES
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For Colour Merchants

CALCINED GLAUBER'S SALT POWDER.

99.93% SODIUM SULPHATE, FREE
FROM IRON AND ACID.
MFG. BY: MIRA CHEMICAL WORKS,
A, Bombay, 12.

using a large quantity of solvents, not shaking but drawing off the clear clazy liquid. Collapsible tube for rubber solution may be supplied by Sikri Bottle Stores, 9, Ezra Street, Calcutta. This industry does not require much capital. A sum of Rs. 100 will do. (2) A well furnished cigarette making plant will cost one lac of rupees. The machinery may be supplied by T. V. Lynn & Co., 58, Forbes Street, Fort, Bombay. No factory entertains students. (3) For producing cheap soaps you may consult our book on Soap Manufacture price Rs. 1-8 only. You may also refer to Mr. R. Ghose, Soap Expert, 8, Kripanath Lane, Calcutta.

1827 M. C. F., Warangol—A list of woollen and other kinds of carpet dealers follows:—Rahim Bakhsh & Sons, 2, Waterloo Mansions, Mayo Road, Bombay; Francis Harrison Hathaway & Co, Government Place, Calcutta; Bhagwandas & Co, Chawri Bazar, Delhi; All India Agency Ltd, Bangalore, Mysore; Kashmir & Kabul Stores, Hall Road, Lahore; Taylor & Co. Ltd., Armenian Street, Madras. Detailed list will be found in Industry Year Book & Directory. Please negotiate with them direct.

1828 S. S. Colombo—The following are camphor manufacturers of Japan.—T. Fujisawa Co., 1, Doshomachi 2-Chome, Higashiku, Osaka; Iwai & Co. Ltd., 43, Kutahama 4 Chome, Higashiku, Osaka; M. Ohkita Co., 4, Shinmachi Minamidori 5 Chome, Nishiku, Osaka. For agency please negotiate with them direct.

1829 J. S. J. Quetta—A list of fruit merchants follows:—G. D. Thacker & Co., 337, Old Market, Shaik Memon St, Bombay; Harachand Shivjee, Kharak Bazar, Mandvi, Bombay; Farm & Fruit Products Ltd., 10, Ezra Street, Calcutta; Haji Tilla Mohd. & Bros., Sir Stuart Hogg Market, Calcutta; S. Abdul Raheem & Sons, Ltd., 15, Market Street, Calcutta; Gokuldas Shivjee & Co., 6A, Govindappa Naicken St., G. T. Madras. Detailed list may be found in Industry Year Book & Directory.

1830 C. L. Delhi—Lace making machine may be had of Fries, Joh; 72/82A, Bismarck Strasse, Barmen-U. 27; Ostermann, W. & M. Barmen; both of Germany. French address is not available. Following are Chemical dealers.—Gujrat Industrial & Chemical Works, Love Lane, Mazagaon, Bombay.

1831 H. P. B., Bombay—(1) Q. S. means sufficient quantity. (2) Formula of red marking ink appeared on page 316 in August 1935 issue of Industry. Black marking ink is prepared thus.—Silver nitrate 2 oz., soda carbonate 3 oz., water 10 oz., tartaric acid $\frac{1}{4}$ oz., litmus $\frac{1}{2}$ oz., gum 4 oz. Dissolve the silver nitrate, in 4 oz of water and the soda in 6 oz. of water separately. Add the soda solution to the silver solution so long as a white precipitate is formed. Filter and wash the precipitate with distilled water and rub it in a mortar with some water and tartaric acid. Now add ammonia cautiously until the precipitate is redissolved. Finally add litmus or water soluble blue and the gum in solution. Dilute if necessary, (3) Formulas of various articles will be found in our publications.

1834 V. N. K., Ranipennur—Your query is under investigation and will appear in an early issue of Industry.

1835 N. M. Kumbharia—Refer to the Secretary, Royal Calcutta Turf Club, 13, Russel Street, Calcutta,

1836 S. C. J., Kopay—(1) Coffee tablet will appear in an early issue of Industry. Sugar coating of tablets has been fully discussed in Pharmaceutical Formulas published from this Office. (2) If you want your queries to be replied through the medium of Industry you need not pay anything; but if you want them to be replied by post you will have to send postage stamp worth 4 annas only for each query.

1837 D. N. K. Jamnagar—Replied by post.

1839 H. P. K., Bombay—(1) There is no permanent depilatory. (2) The following is a formula of depilatory pomade: Sodium carbonate $\frac{1}{2}$ oz.; Barium sulphide $1\frac{1}{2}$ oz.; Arrowroot 1 oz.; Pulv. orris $\frac{1}{2}$ oz.; Olive oil 1 oz. Don't use metallic vessels in the preparation. Macerate finely pulverised orris root and barium sulphide in a stone mortar for half an hour with arrowroot. Now damp the whole with a mild solution of sodium carbonate and add olive oil to form a coarse emulsion. Macerate again thoroughly and pack. No depilatory as a hair oil is known.

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FOR MANUFACTURE OF SOAP.

1840 A. K., Leh—The following are Indian firms manufacturing cigarettes: Rameshwar Tobacco Co., 95 Grand Trunk Road, Salkia, Howrah; Upper Sind Cigarettes Mfg. Co., P. O. Sukkur, Sind; Standard Cigarette Mfg. Co., Sadar Bazar, Delhi; Mysore Cigarette Mfg. Co. Ltd., 29, Malawalli Rama Rao Lane, Bangalore City. Detailed list may be found in Industry Year Book & Directory.

1841 S. M. & E. W., Delhi—The rubber stamp ink prepared by you has got fermentation. To prevent this add a little methylated spirit or acetic acid.

1842 S. G. A., Kabul—A well furnished cigarette Mfg. plant will require a lac of rupees to run on. For estimate and every other particulars please write to Messrs T. V. Lynn & Co., (Cigarette Machinery dealers), 58, Forbes Street, Fort, Bombay. You may also go through the article Manufacture of Cigarette in India appeared in October 1934 issue of Industry.

1843 J. M., Imphal—(1) The cotton waste as per sample may be had of cotton mills, a few addresses of which follow:—Adarsha Cotton Spg., & Wvg. Mills Ltd., Silchar, Assam; Bengal Luxmi Cotton Mills Ltd., Serampore, Hooghly. (2) Tin basin may be had of Bengal Tin Box Mfg. Co. Ltd., 1, Jadunath Mitra Lane, Calcutta.

1845 S. A. M., Rangpur—(1) Orris root is a kind of root which contains an essential oil highly valued in perfumery. The essential oil or tincture of orris root is used to perfume hair oils, (2) Cocoa butter is oil theobroma; it is added to a hair oil to increase the thickness of the oil. (3) To make the perfume lasting a fixative agent should be added. The following are fixatives:—Musk, civet, ambergris, castor, labdanum, vetiver (khus) Balsam Peru, etc. They should be used in minute doses (1%) and in alcoholic solution, (4) Formula No V. page 155 of Indian Perfumes Essences & Hair Oils will give you an excellent hair oil. (5) Formulas of lotus scents, etc., are all contained in that book. (6) You may use Seitz Filter to be had of Chas Granat Stein & Co., 1, Grants Lane, Calcutta. (7) For price of the filter

mentioned by you refer to the dealer. (8) Refer your Query to Director of Agriculture, Dacca.

1846 J. P. S. Saprun—Let your brother read Industry magazine and other publications. He will thus get some idea about various industries. A tendency to undertake some industry will thus creep into his mind imperceptibly which will culminate in making a choice and that will suit him best.

1847 R. A. W., Rajahmundry—(1) The process of separating pure aluminium from broken utensils will appear in an early issue of Industry. (2) For supplies of broken aeroplane sheet you may write to flying clubs such as Aero Club of India & Burma Ltd., Delhi & Simla; Bengal Flying Club, Dum Dum. (3) Formula for making graphite crucible appeared in October 1934, issue of Industry.

1849 B. S. N., Cawnpore—The following is the formula of a solid disinfectant: Naphthalene powder 18 parts, soap powder 4 parts. Mix.

1851 S. S., Jummapudi—(1) An article on gramophone record manufacture will be found in February 1935 issue of Industry. (2) If you go through the article you will get all information required. (3) Following is a list of homeopathic physicians Dr. J. N. Majumdar, 203/1 Cornwallis Street; Dr. S. K. Nag, 18, Beadon Street; Dr. N. M. Choudhuri, 12, Lindsay Street; Dr. N. Ghatak, B. A., 124/1/1, Bow Bazar Street and Dr. Barid Baran Mukerjee, 1A, College Row; all of Calcutta. (4) For books on railway write to A. H. Wheeler & Co., 11, Clive Street, Calcutta.

1852 V. R., Kistna—(1) We have no book on envelope making but an article on envelope making appeared in August 1934 issue of Industry. (2) Envelope making machines may be had of Oriental Machinery Supplying Agency Ltd, 20, Lall Bazar Street, Calcutta.

1857 H. S., Jutogh—In making hurricane lanterns two hundred or more mechanical operations are required to be undergone. Different kinds of machines are used for carrying out the various operations such as cutting, drawing, threading, assembling, wire straightening pres-

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sing, slotting, turning, bending, folding, trimming, spring making, etc. Metal sheets of very uniform thickness are cut into different sizes and pressed and punched in order to make the various parts such as the oil tanks, the columns, the thread funnel with its screwed caps, the burner, the burner cap, the perforated screen, the globe lifting lever guide, the wire guards, the top string, etc. Hence it is found that all sorts of sheet metal working machines are used. For sheet metal working machines write to Taylor & Challen Ltd., Birmingham, England.

1858 J. K., Rangoon—(1) For gelatine write to Allied Agency, 16, Bonfields Lane, Calcutta, (2) Edible colour may be had of Fuzlehussein & Bros., 44, Armenian Street, Calcutta and Fatehchand Hiralall, 43, Armenian Street, Calcutta.

1859 L. F., Thatho—(1) Address of Attock Oil Co, Ltd, is Rawalpindi. (2) Refer your query regarding betelnut cultivation to the Director of Agriculture of your province.

1860 S. H. L., Ahmedabad—(1) Put the thing to be melted in a pot which should be placed in a vessel containing water and it should be placed over fire. In this way things are melted on water bath, (2) Chemicals may be had of Gati Awin & Co, Opp. Railway Station, Ahmedabad, and Gujrat Chemical Works, Ahmedabad. (3) For industrial machines write to W. J. Alcock & Co, 7, Hastings Street, Calcutta, (4) Formulas of boot polish will be found in Prospective Industries published from this Office. (5) Formula of disinfectant fluid will be found in January 1935, issue of Industry. You may also refer to Mr. M. Mitter, M.Sc., 3D, Maharani Hemanta Kumari St., Calcutta. (6) A good recipe of fruit salt will be found in February 1935, issue of Industry. (7) Formulas of all kinds of ink will be found in Manufacture of Ink published from this office.

1861 D. P. S., Howrah—(1) A good formula of incense sticks will be found in December, 1934, issue of Industry, (2) You may secure the sticks locally. (3) No machine is required for making incense sticks. (4) From the huge demands for incense sticks it is thought that this business will be profitable.

1862 K. C. S., Dera Ghazi Khan—You may secure service as an overseer in the Reconstruction of Quetta. You may however go through the Wanted Columns of Statesman and if you find any suitable job you may apply for it.

1864 S. P., Sathanoor—For ribbon weaving machine write to W. H. Braddy & Co., Ltd., Mercantile Bldgs., Lall Bazar, Calcutta.

1865 K. P., Secunderabad—For diploma in ophthalmology write to The Indian Optical Institute, 12, Lindsay Street, Calcutta.

1868 S. F. Ajmer—Soap stone and china clay may be had of Calcutta Mineral Supply Co, 31, Jackson Lane, Calcutta. Formula of shaving soap will appear in an early issue of Industry.

1869 B. B., Prome—Following is a formula of paper varnish: Canada balsam 1 oz., oil of turpentine 2 oz., mix and use.

1870 N. D. O., Batala—(1) You may consult Japan Trade compiled by the Osaka Commercial Museum, Uchiomachi Hashizumecho, Higashi-ku, Osaka, Japan, (2) For toys and fancy goods write to Wachel Molla & Co., 10/11, Dharamtala Street, Calcutta.

1875 J. L. G., Bandon—For rope making machine write to Indo-Japanese Commercial Museum, 135, Canning Street, Calcutta.

1876 B. B. S., Sidhpur—You may invest Rs. 50,000 for starting slate and slate pencil making industry. For a well equipped factory various sorts of machinery are required viz, frame making machinery, machinery for working stone slates, machinery for manufacturing slate-pencils from waste of slates and from small blocks of stones. All these machinery will cost you about Rs. 25,000.

1882 H. C., Hoshiarpur—We cannot understand the exact nature of your requirement.

1883 S. R. G., Madhubani—Process of manufacturing hand-made paper will appear in an early issue of Industry.

1884 A. N. G. R., Kaikaram—Following is a list of rubber stamp makers: Alexandra Industrials, 4, Alexandra Road, New Gamdevi, Bombay 7; Masani & Co, 43, Meadows Street, Fort, Bombay; James Manufacturing Co, 407, Kalbadevi Road, Bombay; B. M. Bysack, 1/1, Ramchand Ghose Lane, Calcutta; Economic

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Rubber Stamp Mfg. Co., 4B, Kasi Bose Lane, Calcutta, and India Rubber Stamp Works, 49, Ezra Street, Calcutta.

1888 S. V. M. P., Paramakudi—Following is a formula of liquid soap: Coconut oil 45 lbs; castor oil 45 lbs; caustic potash 18½ lbs; water 37 lbs. Dissolve the potash in water. Boil the oils with the lye until saponification is complete. Now add 60 lbs. water. In 24 to 36 hours a clear fluid soap is produced.

1889 A. H. G. C., Bhavnagar—(1) Hats may be had of Bengal Eastern Hat Manufacturing Co., 17, Komedan Bagan Lane, Calcutta; Calcutta Hat & Cap Manufactory, 27A, Beni Nundun Street, Bhawanipur, Calcutta, and Premier Hat Manufacturing Co., 11, Balu Hakkak Lane, Calcutta. (2) Rain coats may be had of Bengal Waterproof Works Ltd., 2, Nazarali Lane, Ballygunge, Calcutta, and National Dye & Waterproof Works Ltd., 39, Russa Road, Tollygunge, Calcutta.

1890 F. E. P., Bombay—(1) For talkie equipment write to Continental Talkie Equipment Corporation Movietone, Fort, Bombay, (2) Prospect of a cinema business is bright owing to the increase of cinema going people.

1891 G. S., Jammu Tawi—(1) Stationery articles may be supplied by Associated Stationers, 10, Creechchurch Lane, Leadenhall St., London E. C. 3; Jones Samuel & Co. Ltd., Bridewell Place, London E. C. 4 and Millington & Sons Ltd., Broad Lane, South Tottenham, London N. 15, (2) There is no firm in foreign countries who will supply goods on commission basis.

1892 A. F. P. M. C., Karachi—For selling creosote you may negotiate with disinfectant fluid manufacturers. Your name has been registered in our reference book.

1893 A. B., Gujranwala—Please write us clearly which kind of bleaching lotion you require when we shall supply you the formula.

1895 R. L. M., Korea—For flour grinding, oil extracting machines write to Marshall Sons & Co. Ltd., 99, Clive Street, and Krupp (India) Trading Co. Ltd., 29, Strand Road; both of Calcutta.

1896 B. R., Cawnpore—We have no such book. You may however write to W. Newman

& Co. Ltd., 3 & 4, Old Court House Street, Calcutta.

1897 K. D. C., Rawalpindi—Vegetable ghee is made by hydrogenating vegetable oils. Process of hydrogenating oils will be found in Vegetable Oil Industry published from this Office.

1898 K. J. V., Travancore—Two articles on match manufacture appeared in January and February 1932 issues of Industry. Match making machines may be had of H. R. Bros. & Co 84/1C, Bechu Chatterjee Street, Calcutta; and Bhowani Engineering & Trading Co, 56, Gouribari Lane, Calcutta. You may start a factory with Rs 25000.

1901 K. & C. Bombay—Naphthalene ball making is very easy. It is naphthalene powder liquefied by heat and moulded, but the preparation of Naphthalene itself is somewhat difficult. I am afraid your cost may not stand foreign competition.

1902 K. R. M. Madras—(1) Asafoetida is a gum resin obtained by wounding the upper part of the root (of the herb which is 2 to 4 ft. high.) from which a small quantity of a fine gum escapes and is collected. (2) Envelope making machine may be supplied by A. Hickey & Sons, Post Box 60, Cawnpore. Necessary instruction required for handling the machinery will be supplied by them. Paper may be had of British India Paper Co., Anderson St. Madras; Md. Musa Hajee Ebrahim & Co., 3-1, Godavari St., Madras.

1903 G. D. P. Kopaganj—Refer your query to U. P. Public Service Commission.

1907 M. C. M., Mussooree—W. E. Z. Export Directory of German Manufacturers may be had of Verlagsanstalt des Leipziger Messamts G. m b. H., Leipzig, 6, Liebig Strasse, Post Box No. 285, Germany.

1909 R. D. S., Jalgaon—A capital of Rs 500/- will do to conduct any of the industries viz. catechu, dentifrice, Indian tobacco & pickles, chutneys, etc. Soap (washing only) will require at least Rs 1000; Vegetable oil industry will take over 10 thousand rupees.

TO THE MANUFACTURERS!

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REVIEW OF BOOKS

DEMOCRACY BY C. DELISLE BURNS, M.A., D. Lit. Published by Home University Library, Thornton Butterworth Ltd., 15, Bedford St., London W.C.2. Pages 256, price 2s. 6d.

Though democratic ideals have been in evidence since the first days of attempts at government of a country, these did never possess as firm hold on the world as in these present days. Political philosophers have been at work for generations, discussing how government operates, and how it should be organized, and the tendency in these days for advanced countries is to drift towards experimenting on democracy. Of course autocracy and dictatorship are raising up their heads once again; but still it must be admitted that these seem to owe their existence and nourishment to public support and appreciation.

The present volume published by the Home University Library adds to the triumph already scored by the publishers in disseminating knowledge on all branches of learning in a style that is comprehensive to even the layman. The volume under review starts from the very beginning of political administration in the world and traces in an illuminating manner the gradual development of the democratic ideals. The rival theories so far as the government of a country is concerned are also dealt with and their salient features are brought out. The treatment is not restricted to the stand point of system of government only but covers also political philosophy. Mr. Burns also records the defects and achievements of democratic institutions. This is a most interesting study for any citizen, and as a matter of fact the weak points in the democratic system of Government have been weighed in the balance against the strong points which render the system generally acceptable in the present days. The advocates of and opponents to democracy will find their views expressed with clarity and without any bias. A separate chapter is devoted to an enumeration of the institutions through which democracy operates, e.g., representation through voting, public deliberations of important matters affecting the state, defence, law, education, etc., etc. The achievements and failures of democracy in the direction of industry and peace have also been properly discussed. One noticeable feature of the book is that it is admirably written and extremely lucid in its treatment. The book can be safely recommended to our readers.

GOLDEN RULE SALESMANSHIP by Herbert M. Casson. Published by the Efficiency Magazine, Kent House, 87, Regent Street, London W.1. Pages 144, price 5s.

There are any number of books on salesmanship but this one from the pen of that master mind Mr. Casson should deserve careful reading. The book lays bare the secrets of successful salesmanship and explains at length the modern conceptions about the art. In the history of early business expansion salesmanship was aided by military tactics and meant attacking the customers from strategic points to coax him to purchase articles without any reference to the requirements of the customers themselves. Sales people were content to effect sales and the one who could do this at the biggest price was considered to be the best of the lot. In modern age this is only crude salesmanship and is one of low level. Its foundation is based on tricks and deceptions. It does not take into accounts the customer and his conveniences.

Modern business has come to understand that it can stand only upon honesty which is in sooth the best policy in business. Businessmen who are long in the line have learnt to their bitter experience that it is honesty that wins in the long run and fixed price is the best principle to follow. With the changed outlook about business, conceptions of salesmanship are bound to suffer changes, salesmen are no more men of inferior status seeking their own interests by fleecing the customers. In all up-to-date books on salesmanship they are advised to think of the customer first and to retain their custom at least for a fairly long period of time. Salesmen must play the part of a true consultant between the customer and the seller and by his reliable and ungrudging service win the confidence of the customers.

In the present book Mr. Casson has drawn the attention of the sales managers, shopkeepers, canvassers, shop assistants and all others who fall under the category of salesmen to this golden rule salesmanship and suggests methods which will be appreciated by all as practical and useful in increasing sales and keeping customers. In fact he attempts to lift the profession to a higher level and to raise the status of the sales-people for which he deserves the highest credit from all persons interested in the line.

THE MAGIC OF COMMON SENSE by George Frederick Wates. Published by John Murray, 50, Albemarle Street, London W.1. Pages 150, price 3s. 6d.

Of all the bewilderments that beet us in the many twisted conditions of life, perhaps the most bewildering are the infinite number of divergent theories on almost every subject in heaven and earth. What different and contradictory theories have been promulgated on questions of government, medicine, philosophy, music and religion! On the last topic, indeed, the babel of tongues has been most prolific. What will serve as a guide through the intricate labyrinth of opinion!

The aim of the book has not been to express any particular opinions but to encourage as far as it could the right attitude towards life, to plead for discrimination, plasticity, breadth of view, charity, for intellectual honesty with one's self, and for the recognition that the ingredients of life cannot be rigidly confined in separate air-tight compartments but act and react upon one another in various ways. The author has not been concerned so much with the results of thinking as with the first essential—a wholesale commonsense atmosphere in which right reason would grow and thrive, or to change the figure of speech, not so much with the shape of the building as with the condition of the tool.

Mr. Wates draws the pointed attention of the readers to a number of obstacles to clear thinking. These require careful analysis before one can dare to cultivate common sense, the verdict of which sometimes runs counter against the facts arrived at by some eminent philosophers of old. Chief among them are Believing as one wishes, Selecting facts to fit theories, Source of epigrams; Lure of coincidence; Faddism and Fanaticism; Influence of repetition; Undue emphasis. He explains how the highest ideals are frustrated by lack of clear vision and wise leadership. 'Follies of the wise' as depicted by the author make interesting reading. The book is a welcome addition to the library of any body in these days of reason.

THE PRINCES OF INDIA by Sir William Barton, K.C.I.E., C.S.I., Published by Nisbet & Co., Ltd., 22, Berners Street, London W.1. Pages 327, price 15s.

While the question of the federation of British India and Indian States is still occupying the imagination of the Indian and British statesmen, a handbook giving a comprehensive

survey of the historical and constitutional position of the Indian princes will be very welcome. Sir William is to be congratulated upon compressing much interesting facts about the Indian States and the ruling princes within the compass of about 325 pages.

To do full justice to the subject would be a tremendous task. There are 562 States in number in India, a full treatment of which will entail great labour and time. Sir William therefore limits the scope of the book to the discussion about the more important States, particularly those which participated in the deliberations in connection with the Indian Reforms.

On the historical background of Indian India and the gradual establishment of British sovereignty, Sir William delineates with consummate art life in the Indian States in vivid colours. One gets here glimpses of rural life in the country of the Durbars. There are interesting touches on court life, shooting excursions, peagantry, Durbars, sports, harem, etc., etc. The politics in the State is a subject important enough to have deserved a separate chapter being allotted to it. From his intimate experience with the Indian Princes Sir William narrates how a distinctly conservative policy and passion for intrigue are more insistent in Eastern than in Western psychology. It is rife in British India; it is still more so in the States, where the prizes are more numerous ranging in the official sphere from a village accountancy to the post of Prime Minister. Sir William has however not been blind to the new outlook in evidence atleast in some of the States. He alludes to the fact that a majority of the rulers of the more important States recognise that they can only justify their existence by good governments and that to secure such conditions must be their chief concern. There is also a feeling at least of solidarity between the people, the ruler, and his administration.

Subsequent chapters are devoted to an account of the principal Rajput States, Kashmir, Sikh States, Mysore and Travancore, the Marathas, Hyderabad, Moslem States, etc., etc. The accounts are packed with interesting historical facts, political tendencies, etc., etc. Then follow chapters on Sub-ordinate Alliances, the relation between the Princes and the Government of India and finally their place in the coming federation. A chapter has been added on Nepal, though it does not constitute a Native State in India. The book gives an insight into life and politics in the Indian India.

NOTICES & REVIEWS.

[Manufacturers sending specimens and samples of their products for notice and review may please note that no notice is published of medicinal preparations and allied substances in this section.]

Mosquito Oil.

We have received from Asiatic Chemical Works, 68, Beadon Road, Lahore a sample phial of mosquito oil. It is claimed to be an effective preparation against mosquito bites.

Essential Oils.

We are glad to receive two sample phials of compound essential oils rose and jasmine manufactured by N. Banerjee, 48, Sreegopal Mullick Lane, Calcutta. The preparations are found to be quite satisfactory.

Picture Frames.

We are given to understand that Bombay Picture Frame Mfg. Co., 11, Ajmeri Gate, Delhi are manufacturing picture frames of all sizes and colours. We hope that our countrymen would do well to give them a trial.

Stained Glass Paper.

We have the pleasure to receive from Messrs. Samson & Co., Triplicane, Madras, S E samples of stained glass papers of various attractive designs specially suitable for decorating windows most economically. It is the best substitute for stained glass.

Tooth Powder.

We have received from R. Narasimha Char & Son, Githa Stores, Lakshmi Vilas Road, Mysore a sample packet of tooth powder. It is medicated and good.

Tennis & Badminton Guts.

We have the pleasure to receive samples of tennis and badminton guts from Messrs Coxwell & Co., Sialkot City, Punjab. The guts are found to be strong and serviceable.

DO YOU KNOW !!!

That, Paris Gold, the Scientifically made Imitation Gold in solid Bars like Pure Gold, is sold only @ Rs. 6 per oz (2½ Tolas); Rs 10 for Two ozs, and Rs. 64 per lb. Mainly used with Pure Gold to cheapen its high cost—retaining it Acid Proof. Guaranteed Satisfaction or Money Back. Better, order now for an oz or Two of Paris Gold, before you are fully convinced to place a Big Order. *Wanted Agents,*
HOUSE OF COMMERCE,
Ulubari Road, Gauhati, 34

A New Periodical.

Better Money is a new monthly bulletin of monetary reform. The May issue under notice contains important articles from the pen of several distinguished writers. It is published from Daily Gazette Buildings, Karachi.

A Medical Book.

We have received a copy of Malaria and its Prevention (in Bengali) by Girijanath Roy, Kavaratna. The booklet deals with the various causes of this destructive disease carrying a large toll annually and its treatment with indigenous plants and herbs, scattered in villages all over Bengal. The book will prove useful in preventing malaria. It can be had of the author at 35, Scott Lane, Calcutta. Price 4 annas only.

An Insurance Coy.

We have gone through the schemes of the City Insurance Company, Limited of 8, Old Court House Corner, Calcutta. The special feature of the Company is that any person of either sex aged between 18 to 50 years may take full advantage of the Company by taking a policy from Rs 100 to 500 without Medical Examination by paying small premiums according to their age. The management is in the hands of Messrs. Federation Corporation, a leading business firm in Calcutta. We wish the Company every success.

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Trade Enquiries.

(To communicate with any party write to him direct with name and address given below mentioning Industry).

1597 H. L. Mohamed, 11/2, Sukeas Lane, Calcutta—Wants to be put in touch with the suppliers of deer, Shamber and buffalo horns, bones, gorachana, wool, hide fleshing and lizard skin.

1608 The Agra Swadeshi Brush Co., Agra—Can supply Swadeshi brushes.

1726 K. Narasinha Murthy, Barline Road, Shimoga, Mysore State—Wants to be put in touch with a capitalist who can finance a lucrative business in S. India.

1756 Esvier & Co., Vizagapatam—Can supply large quantities of black granite metal and wants a capitalist partner to work manganese mines in Vizagapatam.

1757 A. C. Guha, P46/1, Sadananda Road, Kalighat, Calcutta—Wants a capitalist for financing a lucrative business.

1764 Mayne & Co., Beadon Road, Lahore—Want to be put in touch with suppliers of gums, herbs, drugs, beeswax, tanning and dyeing materials, scrap and waste products, minerals, etc.

1821 Jagatsinhji D. Jadja, Morvi, Kathiawar—Wants to be put in touch with dealers and buyers in bone-meal fertilizer.

1837 D. N. Kankhara, Hava Chawk, Jamnagar—Wants to be put in touch with suppliers Hina flowers.

1843 Jamunalal Mangilal, Imphal, Manipur State—Wants to be introduced with dealers in seedless had cotton in India and tin basin manufacturers of Calcutta or any town in Bengal.

1844 Chimanlal K. Mody, 1B, Radha Galli, Morarji Gokuldas Market, Bombay 2—Wants to dispose off 2000 lbs. i.e. about 8000 yds of insulated cloth of American make at discount.

1900 India Export Trading Co., Post Box No. 112, Karachi—Wants to be put in touch with oil mills purchasing toria and rape seed for crushing.

1901 Kalyanwala & Co, Bhat Bazar P. O. 9, Bombay—Wants to consult some experts in making Naphthalene balls, commonly known as Damar Gollis, Phynefe Pills, etc.

2050 A. Raphael, Basrah, Iraq—Wants to be put in touch with reliable manufacturers of felt hat.

2106 Forest Utilization Officer, Gauhati, Assam—Can supply rhinoceros horns and hoofs, ivory, chaalmuera seeds, pipul, beeswax, crude lac, nageswar flower and seed, timber, etc.

2131 Indo-Euro-Japan Trading Syndicate, Vora Bazar, Bhavnagar—Wants to be put in

touch with German, Japanese and British exporters of iron, hardware galvanised corrugated sheets, cutlery, school slates, lead pencils, stationery, copper and brass sheets and circles, old newspapers, etc.

OCTOBER ISSUE OF INDUSTRY.

(In the Press).

October issue of Industry which will be published on the first day of the month will contain articles on The Manufacture of Chocolate, Manufacture of Medicated Soaps, etc., besides the usual features such as Small Trades and Recipes; Formulas, Processes and Answers; Reader's Business Problems; Brief Queries and Replies. Any friend of our subscribers will get a copy free as sample on application to the Manager, Industry, Shambazar, Calcutta.

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Industry

THE MAGAZINE FOR MANUFACTURERS & BUSINESSMEN.

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Rightly Seeking Opportunity.

THE warcloud that darkens the sky in East Africa, now appearing no bigger than what isles a light in the offing and causes scarce anxiety to the mariners on the high sea, overshadows the season of friendship and harmony during the Dusserah which permeates a feeling of joy and fraternity through all ranks, castes and creeds of the four corners of India.

The Dusserah is over and with it the holy days that the long holiday brings to the people of India. The shadow that threatens to spread over Africa and Europe, fortunately is still confined during the holy season of fraternity among the hills and deserts of East Africa.

If however war burst out, probability of which appears to be still really remote, there will certainly be enormous demand for war materials—both raw goods and manufactured articles. Demand for supplies from India will be, as in the last war, very great. But is India prepared? Has its Government done anything to make the country of great possibilities capable of supplying stores if British are unfortunately implicated? Have the people done anything to augment its resources in technical capability and manufacturing organisation?

The Government of India, even after its experience in the last war, still purchases annually 30 lakhs of rupees worth of Engineering stores (locomotives) from Germany, and 20 lakhs worth from Hungary. These are besides private purchases and purchases from Great Britain.

Subhas Ch. Bose has sounded a note of warning that every big purchaser in India including the Government should insist on the sellers to train Indians in the technical art.

Every industrially backward country such as Turkey, Persia—makes a condition before making any purchase in any country that a certain number of apprentices should be trained in factories in that country.

The threatened war should be an eye opener not only to the Government but also to Indian Chambers of Commerce. Will they be wide awake?

While offering our heartiest greetings to the readers, and through them to the countrymen, and the workers in the country, we insist, we must make every endeavour to get the nation ready for industrial and commercial progress.

MANUFACTURE OF NEEDLES.

THE manufacture of this little instrument cannot be uninteresting or uninteresting; and it is fortunate that manufacturers are sufficiently liberal to allow the many curious and beautiful processes concerned in the production of these tiny articles to be described. Under the dread of competition, it was considered important to keep from the public a knowledge of manufacturing details, and in this way much valuable and curious information doubtless became lost. Thus we know nothing that can be relied on respecting the introduction of the needle manufacture or the progressive steps by which the clumsy bodkin was superseded by the light and elegant steel needles. Leaving aside the history, we describe below the modern processes of its manufacture so as to give a clear inside of the steps usually followed by manufacturers.

PRELIMINARY TREATMENT OF THE WIRE.

The raw material of this useful article is soft clean steel wires of various sizes and weights received from factories in coils. The coils are first cut into lengths for making two needles at a time, which is done by inserting the wires between the blades of a pair of shears, fixed to the wall, the workman pressing the shears together with his thigh. The number of pieces thus collected will depend on the size of the needle. The cut pieces are generally to be more or less bent; they must, therefore, be straightened, or serious errors would damage the subsequent processes.

METHOD OF STRAIGHTENING THE WIRES.

The method of straightening is simple and ingenious. Several thousand wires are collected in a bundle by two tolerably broad and heavy rings drawn over them, and holding them together like a faggot. In this state they are placed on a shelf in the furnace, where they are heated to redness, they are then taken out and placed on an iron plate, still retaining their position within the rings. The workman then takes an instrument called a smooth file and placing it in the space between the two rings, rubs the wires backwards and forwards, thus making them roll over each other, and, by mutual friction and attrition, straighten each other. The noise given out by this process of rubbing is very similar to that of filing; at first it is rough, but quickly softens down to a subdued note, which informs the workman that the object of his operation is accomplished.

GRINDING THE WIRES.

The wires being thus straightened, the two ends are pointed by grinding them upon small grit stones of 10 or 20 inches in diameter, varying with the size of the needle. They are made to rotate with great rapidity, and the workman takes a number of wires in his left hand, spreads them out and keeps them parallel by placing the other hand upon them in a peculiar way, moving it so as to make all the wires rotate backwards and forwards, in order that a perfect cone or point may be formed. Every now and then the points are adjusted by pressing

them against a plate, and are dipped into a trough of water to keep them cool. During all this time the workman puts a mask on his mouth and nose so as to protect him from inhaling steel dust floating in the air.

EYEING THE WIRE.

The needle as it leaves the grinder is a straight piece of soft dingy wire, pointed at each extremity. The points being examined to see that they are properly formed, then comes the important business of forming the eyes in the centre of each wire, which is to make two needles. In the success of this process, the time and comfort in seaming are greatly concerned.

The reader need scarcely be informed that the eye of a needle consists of a perforation at the thick end of it, together with a groove or gutter on opposite sides, for the purpose of guiding the thread. If it were attempted to form these by one operation of stamping, the metal would probably be torn and rent asunder, and so damaged by the blow as to spoil the wire. The object is therefore attained by two or three separate cautious steps. First, the gutter is formed, together with the indentation at the spot intended for the hole, by means of a stamping machine, which consists of a bed of iron containing the under half of a die or stamp, supported on a heavy block of stone. Above this is a hammer of about 12 pounds weight, containing the other half of the die. This hammer can be raised by a lever commanded by the foot. The workman holding several wires, drops one at a time upon the iron bed, pushing it up against a piece of metal adjusted so as to determine the

length of the needle; then raising the hammer with his foot, lets it fall with a smart blow. The two raised faces of the die produce two opposite indentation on the wire, bulging out a portion of its substance.

The eyes are next pierced through by small hand presses, each operator takes a number of wires, spreads them out like a fan, places them in a notch formed in a small iron slab, bringing the needle of the wire to the middle of the press. The upper arm of the press contains two steel points or cutters of the exact size of the eye, which fall over corresponding holes in the die. The operator, keeping his head down and punches out the eye. As each wire is pierced, the boy shifts the fan of wires so as to bring a fresh wire under the punch. This is called eyeing the needles, and for some sorts it is performed in a different manner. For instance:—as soon as the wires are pointed at the two ends, they are cut in the middle by means of the upright shears, and then laid parallel to each other in small wooden boxes. Then a workman takes up by the points 20 or 25 needles at a time between the finger and thumb of his left hand, and spreads them out like a fan; he then places the ends of the wires upon the steel block and with a small hammer strikes them in succession, so as to flatten the end of one wire at every blow. The effect of this blow is to harden the ends of the wires; they are, therefore, annealed by being heated and slowly cooled. The ends are then pierced by a smart tap of a hammer. The eyes are next trimmed by placing each needle upon a lump of lead, and driving a punch through its eye;

then placing it sideways upon a flat piece of steel with the punch striking in it, it is tapped on each side with the hammer, thereby making the eye assume the shape of the punch.

By this method of piercing, the groove is formed last. The needle is fixed in a pair of pincers held in the hand, and the head rested in an angular groove cut in a piece of hard steel; then with a single stroke of a small file applied to two opposite sides of the head, the gutter is formed. The head is next rounded and smoothed with a small file.

The method of eyeing the needles by punching the eyes and gutters in the middle of the double wire is the most expeditious and economical and is therefore, generally adopted.

The bur produced on each side of the eye in the process of stamping, has now to be filed off, but as this would be a slow process of stamping, has now to be filed off, but as this would be a slow process if performed on the wires separately, a number of them are collected together by a very ingenious process; they are spitted on fine wires, that is a wire being run through each line of eyes. The bur is then removed with a flat file, after which the separation takes place by bending the needles backwards and forwards between the two spits, thus producing two separate rows of needles, each row spitted on a wire. The points of each row are then grasped in a kind of hand-vice, and the heads filed to the proper shape. The needles are now of the proper length, although still in the rough state, but they are so far advanced as to have an eye, a gutter, and a point.

SOFT STRAIGHTENING.

In the process of stamping and spitting and separating the needles, some of them become bent; they now go to the soft straightener, that is, being still in the soft state they are made straight by, rolling on flat steel plate, with a smooth steel file, turned up at each end so as to prevent a convex surface. A number of needles being put on the plate parallel to each other, the straightened taking them one by one, gives them a few turns backwards and forwards, by which rolling between hard unyielding surfaces they become straight.

TEMPERING.

The needles are still black, dingy, and soft, and therefore quite unfit to ply their busy task. They have now to be hardened, for which purpose they are spread, by means of two little trowels, in a thickest layer of narrow plates of iron, and placed on a shelf in the furnace. Here they are brought to a red heat, and are then taken out and suddenly cooled by being plunged into cold water to oil. The effect of this operation is to make them very hard and brittle, but they are too much so for use, and require to be made less so by the process of tempering: that is, when taken out of the water and dried, they are again heated, but not by any means to so high a temperature as in the former case, and are allowed to cool gradually. For this purpose they are placed on an iron plate heated by a fire beneath, and are kept in constant motion for about five minutes with small iron shovels; the moment a film of blue oxide forms upon them the needles are considered to be of the proper temper,

and are instantly removed from the plate.

In hardening the needles by plunging them into cold water, they all become more or less bent, they are therefore again straightened. Before hammering, the needles are rolled by the finger on a smooth steel slab, and the touch instantly detects such as do not roll truly; these are picked out, placed on a small anvil, and tapped with a small hammer, whereby they are effectually straightened.

SCOURING.

After straightening the needles are submitted to the process of scouring or cleaning. As the wires were made straight in the first instance by mutual attrition, so by a similar operation they are made bright. For this purpose they are made up in bundles of forty or fifty thousand by the following contrivance. A number of strings are placed across a wooden tray open at the two ends; upon these strings is placed a piece of stout canvas, and within the canvas the needles are arranged in heaps in the direction of their length, but without any distinction as to heads and points. A small quantity of emery, oil, and soft soap being sprinkled over them, they are rolled up into a bundle, and tied up temporarily. The bundle is then wound with a strong twine, in a tolerably close coil, so as to form a compact bundle two or three feet long and about three or four inches thick. A number of such rolls are placed under the scouring machines which consist of an arrangement of troughs containing weighed slabs or rubbers, under which the bundles of needles are moved backwards and forwards in the same way as the rollers of a common mangle. The rubbers make 20 or 30 movements per minute, pressing heavily on the rolls, and causing the needles to rub over and over each other, so that by constant friction, aided by oil, emery,

soft-soap, and polishing putty, a bright surface is obtained. The needles are next unpacked, washed in soap and water and if found that the polish is not up to the standard, they are again tied up, with the addition of polishing putty and oil, and rubbed for a number of hours. This is rough usage for so slender and brittle an instrument as a needle, and the breakage, is often considerable. Of course, the more rubbing the greater is the amount of breakage, but the needles improve their appearance considerably.

FINISHING OPERATIONS.

The needles are now clean and bright in appearance, but by no means finished. The annealed needles are put in a long tin tray and shaken so that they are all brought parallel. They are then made up into long rows and arranged according to their heads and points.

Next comes the delicate and important operation of drilling the eyes, or in other words, removing from each eye the sharp edges. For this purpose it is necessary to temper the needle at and about the eye, so that it may be soft enough to be cut by a drill. This is done by placing the needles on a steel slab, with their heads projecting over the edge; a red-hot plate is then cautiously brought near to them, and the moment they begin to feel the heat they change colour, passing through various shades of yellow and purple until they assume a dark blue colour.

Gold-eyed needles are produced by dipping the head of the needle in ether containing gold in solution, which immediately attaches itself to the steel when dipped in.

After the needles are drilled, the points are finished on a small home-stone, mounted in a lathe, and revolving with great rapidity. Finally the needles are polished by holding them on wheels of wood covered with buff leather, slightly smeared with a polishing paste and are counted and packed.

BRICKS AND TILES.

BRICKS and tiles are ordinarily made of clay or shale, or of a mixture of these with sand. Hence, the raw materials used in brick making include all the clays possessing such a degree of plasticity as will enable them to be formed into bricks, which are, at the same time sufficiently cheap to make the manufacture of bricks reasonably profitable.

Briefly, there are six chief groups of bricks; (a) Building bricks, (2) engineering bricks, (c) refractory or fire-bricks, (d) paving bricks, (e) glazed bricks and (f) lime-sand bricks.

As the subject of brick making is too elaborate to deal within the narrow compass of an article, we will only go through the outline of the process.

QUARRYING OF CLAYS.

The first operation in the manufacture of bricks is the mining or quarrying of the clay or brick earth and its delivery to the machinery which prepares it for use. A description of the various methods of working in clay pits and mines would require a volume to itself, and it must here suffice to state that in mining the ordinary colliery methods are employed, and that in quarrying the clay is usually obtained by means of picks and shovels, the excavation being carried out in a series of shelves or ledges.

CLAY PREPARATION.

The conversion of the freshly-mined or quarried material into one which is suitable for the direct production of bricks is by no means a simple task. Clays and brick-earths vary so much in composition and physical nature that a treatment which is ample for one may

be quite insufficient or even unsuitable in character for another, and any short description of the processes of preparation must necessarily be merely indicative and incomplete.

The object of all preparation processes is the production of a plastic paste of such a consistency that it may readily be formed into bricks or other articles of any desired size and shape. In order that this object may be attained, the material may require to be crushed to powder and then kneaded or mixed with a suitable quantity of water, the latter treatment being carried out in such a manner as will secure a paste of as uniform a composition and texture as possible. Insufficient or careless treatment in the preparation of the paste is one of the most frequent causes of defective goods.

Some clays occur naturally as a paste, which only requires to be kneaded to make it uniform and of the desired consistency; these are easiest clays to manipulate, but the quantity available is limited. Other clays require the addition of water and possibly of sand, chalk, cinder dust or other non-plastic materials, and some of them require to be crushed or pressed into thin sheets before being kneaded; unless this is done the water added will not mix properly, and they cannot be made into a suitable paste.

Before any clay or brick-earth is crushed, however, it should be examined in order to ascertain whether the same effect and other improvements in its

nature cannot be obtained by exposure to the weather. Many hard clays and earths are reduced to a comparatively soft material when exposed to frost, and not a few of them fall almost to powder if merely exposed for a few days to the action of the atmosphere. This exposure (or weathering) not only facilitates the crushing and mixing of the clay, but it frequently brings about chemical and physical changes of the greatest importance to the brick manufacturer. The precise nature of some of these changes is obscure, but it appears to be a kind of oxidation combined with the production of internal stresses and strains which cause the particles of clay to separate from each other and to form a loosely coherent mass. Weathering also effects the purification of some clays by causing the solution of some of the impurities, and, as the water evaporates, some of these are carried to the surface and form concretions or a scum which can be picked or scraped from the surface.

In order to obtain a uniform paste it is necessary to mix the clay or brick-making material with water in a very thorough manner. Hence, the general necessity for first crushing the clay into thin sheets or of grinding it to powder as described. The water and material so prepared (if necessary) may then be kneaded together with a spade, but the process is slow and imperfect. A better result is obtained by treading it with bare feet until the mass is sufficiently uniform; this method is also too imperfect.

It is usual to employ a pug-mill or mixing machine driven by horse-power or mechanically according to the output

required. Such a pug-mill consists of a closed cylinder with an inlet at one end and an outlet at the other, and provided with a shaft which runs right through the centre and is fitted with blades or mixing knives. These knives are specially designed to cut the clay contained in the cylinder and to mix it as it travels from one end of the machine to the other. Pug-mills were formerly of the vertical type, the clay, etc., being fed in at the top of the cylinder and passing out near the bottom, but at the present time a very large number of horizontal pug-mills are in use and have several advantages when employed in connection with other machinery. Moreover, by making the pug mill horizontal a portion of the cylindrical casing may be omitted and an open or trough-mixer produced, with the advantage that the whole of the mixing operations may be observed and any defective blades replaced. It is also much easier to regulate the addition of water and, therefore, the consistency of the paste, when an open mixer is employed.

The speed of rotation of the shaft, the shape and number of the blades, and the length of the pug-mill will determine the extent of the kneading and the resultant texture of the pasty mass. Clays and mixtures which are difficult to work may require to be passed several times through the pug-mill, or through two or even three pug-mills in succession. With most brickmaking clays which have been adequately crushed found ample, but the variation in character of clays in different localities is so great that no definite limit of length can be laid down.

CONSISTENCY.

The production of a paste of the required consistency completes the second stage of brickmaking. The consistency of this paste varies greatly with different clays—some needing to be made into a sloppy material scarcely stiffer than freshly-made mortar, whilst others are so stiff that considerable pressure has to be exercised in order to make any impression upon them.

The softer the paste the easier it is to produce, so that in places where little or no machinery is available, and the bricks are simply moulded by hand, the paste will be extremely soft. Where powerful mechanical mixers are available however, it is more economical to employ a stiffer paste.

METHODS OF SHAPING THE CLAY.

There are a number of different methods in use for converting the prepared clay or mixed material into bricks, and these may now be considered in order.

In consequence of these differences in consistency, various methods of converting the paste into bricks and other articles are frequently distinguished by the kind of clay paste used. Thus—

(a) The plastic methods of brick-making employ a plastic paste, as in the manufacture of hand-made and wire-cut bricks.

(b) The semi-plastic methods of brickmaking employ a stiff paste, and are sometimes termed "stiff plastic" processes.

(c) The semi-dry process of brick-making consists in the use of a moistened powder which is almost devoid of plasticity.

(d) In the dry or dust process an almost dry powder is used.

PLASTIC METHODS.

For hand-made bricks the paste is made into the shape of bricks by means of wooden or metal moulds, consisting of a stout box, without lid or bottom, which rests on a piece of hardwood fastened to a rough table. The base piece is sometimes covered with a special kind of cloth, to which the paste adheres so slightly that the mould with its contents can be readily lifted off. Without the use of such a cloth or of sand sprinkled on the table the clay paste would adhere tenaciously to the table. If the bricks are to have a frog or cavity on one side, a piece of wood or brass is fixed to the table or base piece, and guides or pegs must then be used to secure the mould always being correctly placed on the bench. It is less easy to produce a frog on a slop-moulded than on a sand-moulded brick.

The moulder prepares the mould, places it in a convenient position on the table, and then takes up a convenient quantity of the soft paste in both hands, raises it above his head and throws it down with great force into an empty mould placed on a bench or table in front of him. He then presses the paste well into the corners of the mould, scrapes off any superfluous paste with a wooden blade or "strike," and with a dextrous turn of the wrist he empties the contents of the mould on to a small board or pallet placed in a convenient position. The brick thus produced is carried away to be dried, either by hand or on a barrow of special construction, so as to avoid undue vibration of the bricks. Meanwhile, the moulder dips his mould in

water so as to wet it thoroughly (slop moulding), or first in water and then in sand (sand moulding). If sand is used it will cling to the surfaces of the clay in contact with the mould and will produce a rough-faced brick, the colour of which will depend upon that of the sand when burnt. As red-burning sand is generally employed for this purpose, sand-faced or sand-moulded bricks are usually of a good red colour when sold, whilst slop-moulded bricks are the same colour as the burnt clay of which they are made.

The rate at which hand-made bricks can be moulded is very great, a fair average being 36,000 or more sand-moulded, or 9,000 to 10,000 slop-moulded, bricks per week.

Each brick when freshly moulded contains about 1 lb. of water, and this must be removed by drying in such a manner that the brick is not damaged. Slop-moulded bricks are usually allowed to remain on the flat or floor for about six days, after which they may be stacked in an open fashion in long rows about six bricks high, so as to make more room for fresh bricks. They remain stacked for several weeks until dry enough to be burnt. Sand moulded bricks being stiffer are arranged in backs immediately after they have left the mould.

DRYING.

The drying of bricks always requires care and attention; apparently insignificant draughts will crack many bricks, and even if the sun shines on some bricks during drying the damage will be serious. Hence, a considerable proportion of the anxiety experienced by the owner of a yard where hand-made bricks are pro-

duced is due to the difficulty of avoiding loss during the drying, especially if the clay is a tender one.

The thoroughly dry bricks are next taken to a clamp or kiln to be burnt in Hoffman's Ring Furnace or in suitable kilns as described under tiles.

WIRE-CUT BRICKS,

Wire-cut bricks are produced by machinery; they are not moulded, but are shaped by expression through a suitable die in a manner greatly resembling the production of sausages. The plastic paste (prepared in one of the ways previously described) is passed from the mixing machine into a pug-mill, the die being attached to the exit end of the latter, and thus forming a mouthpiece, through which the clay exudes in the shape of a band or column $9\frac{1}{4}$ inches by $4\frac{1}{4}$ inches. i.e., whose width is the length of a brick, and whose thickness is the width of a brick. This band is cut into convenient lengths by means of a wire stretched tightly in a frame, and each section is again cut into pieces about $2\frac{1}{2}$ inches or 3 inches wide by a series of other stretched wires. In this manner the bricks are produced six or more at a time, and are taken away on long boards or pallets to be dried.

This process of brickmaking is exceedingly simple in theory, but there are numerous matters in connection with it which require skill and care if good bricks are to be produced.

SEMI-PLASTIC METHODS.

In the semi-plastic or stiff-plastic methods of brickmaking a paste of such stiffness is employed that very considerable pressure has to be used in order to

obtain the imprint of a thumb or finger. This very stiff paste is usually prepared from a powdered shale or other indurated clay, as the variations in stiffness of clays quarried in a stiff plastic condition make their use inconvenient.

The crushed, screened and powdered clay is received in an open mixer, and is there kneaded with the requisite quantity of water and passed into a small but powerful pug-mill which compresses it into metal moulds. These moulds may be arranged on the top of a rotating table or on the circumference of a drum, both these constructions having proved satisfactory. The rough-shaped bricks or clots are then removed from the moulds, one at a time, and are pressed accurately to shape in a plunger-press, which is attached to the same framework. The shape of the moulds and the arrangements provided for removing the clots from them has a great influence on the power required by the machine, it being generally found that the simpler the clot mould the better.

The advantages of using so stiff a paste are twofold; the clay is obtained in a condition suitable for immediate pressing into shape, and the bricks may usually be sent direct to the kiln without the need of drying. A considerable saving is thereby effected, as it is difficult to watch the drying of plastic bricks so closely as to be able to re-press them when all are in the best condition for this operation, and further, the cost of a drier is completely avoided, though against this there is the cost of additional fuel required in the kiln. Where a continuous kiln is not available these bricks must, in some instances, be dried before

being placed in intermittent kilns for burning the bricks.

SEMI-DRY PROCESS.

In the semi-dry process the material is used in the form of a powder which contains just sufficient moisture to make it 'cake.' It can only be used with shales and dry clay which are almost devoid of plasticity. The powder is obtained by crushing the material with edge runners and is fed into the boxes of plunger presses of a particularly powerful type, in which it is compressed into bricks. Several types of press are in use; in each case they must be capable of exerting an enormous pressure and of giving several compressions in succession, as a single pressure, however great, will not produce a sound brick. It appears to be necessary to press once, release the pressure and allow air to escape, re-press, remove from the mould, and again re-press either once or twice before a reliable brick can be made from some materials.

This process ought never to be installed except under expert advice which is quite independent of that of the various makers of machinery, or serious disappointment may result. It is therefore unnecessary to describe it in greater detail here.

DRY DUST PROCESS.

The dry dust process is seldom used for bricks, as the difficulties experienced in obtaining sound bricks are very great. For tiles and other thin articles it is largely used. As the name implies, the clay or shale is ground to the form of a dust and this is placed in the box of the press and is duly compressed into the desired shape in a manner similar to bricks made by the semi-dry process. The diffi-

culty of removing all air from between the particles and of exercising a perfectly uniform pressure over every part of the brick is so great as to make the use of a semi-dry material necessary for brick-making. Indeed, the machines which are supposed to be making bricks from dry dust are, in almost every case, working with a slightly moistened material by means of the semi-dry process

TILES.

Like bricks tiles are used, for a variety of purposes. They may be divided into two main groups:—

- (a) unglazed tiles made of natural clay.
- (b) glazed tiles made of a mixture of fine clays and other materials forming on earthenware body.

The second group is regarded as a branch of pottery trade which has no connection with the manufacture of bricks, and is therefore not taken up in this article.

The first group consists of tiles which are manufactured in a similar manner to bricks, the principal differences arising from the thinness of the ware, which requires the clay to be finer and stronger, and renders it necessary to conduct the whole of the processes more carefully than in making bricks.

This group of tiles is again classified as follows: paving tiles, encaustic tiles, roofing tiles, and drain tiles. Let us begin with the manufacture of roofing tiles.

As already stated above that the clay required for the purpose of making tiles should be stronger and freer from impurities than that used for making bricks,

consequently it requires more care in its treatment.

When the clay is too strong, it is mixed with sand before passing it through the pug mill.

The weathering of the clay is performed by spreading it out in thin layers during winter, and each layer is allowed to receive the benefit of at least one night's frost before the succeeding layer is placed over it. The object of the process of weathering is, to open the pores of the clay, and to separate the particles, that it may absorb water more readily in the subsequent process of mellowing and tempering.

The clay thus weathered is thrown into pits where it is covered with water, and left for a considerable time to mellow, or ripen.

TEMPERING.

After weathering the clay is passed through the pug-mill. If the clay is not good, that is, full of stones, it is slung before using, and passed a second time through the mill. It may be slung either once or twice, and pugged twice or thrice, according to the nature of the clay.

SLINGING.

In this operation the clay as it issues out of the ejectment hole of the pug-mill, it is cut into lengths of about 2 ft., with a sling. These lumps are taken by the slingers and cut up into slices so as to remove the particles of stones by hand picking. The clay thus freed from stones is once more ground, and is then ready for the moulder.

MOULDING.

The clay, as it issues from the mill is cut into lumps which are stacked on a

rough bench in the shed. These lumps are again cut half ways and are then made into square slabs of 4 in. thick. They are then cut into the size of tiles and moulded. For this purpose the moulder, having sanded his stock board, and placed his mould on the four pegs, takes the slice of clay from the rough-moulder, and puts it into the mould. He then, with very wet hands, smooths the surface, cutting off the superfluous clay with his hands. This done, he strikes the surface level, with the roll; and turning the tile out of the mould on the washing-off frame, with very wet hands washes it into a curved shape. He then strikes it smartly with the splayer, and turns it over on that implements, on which he conveys it to the block, where he keeps tile with the convex side uppermost, and, the splayer being withdrawn, the tile is left to dry. The button end of the tile is placed inside the block.

THWACKING.

The tiles remain in the block until they are half dry, when they are taken out one by one, placed on the thwacking frame, and beaten with the thwacker to perfect their shape.

The wing of each tile is then trimmed with the thwacking knife, and the tiles replaced in the block still with the convex side uppermost; by this time the button end is placed outside. The tiles then remain in the block until ready for burning.

SETTING & BURNING.

In setting the kiln, a course of vitrified bricks is laid at the bottom, over this the tiles are stacked as closely as they will lie, in an upright position, one course above another. As the body of the kiln

is filled, the hatchways are bricked up with the old bricks, and when the kiln is topped, they are plastered over with loam or clay. The top is then covered with one course of unburnt tiles, placed flat, and lastly, upon these a course of old pantiles is loosely laid.

After this the kiln is set on fire so as to burn the tiles to their required magnitude. The fuel used is coal, and the quantity consumed at each burning is about 8 tons.

PLAIN TILES.

In the manufacture of plain tiles, the clay is dug and spread to weather in the same manner as indicated under roofing tiles.

The weathered material is next mixed with a quantity of water and placed in the pug mill so as to make it suitable for the moulding operation.

MOULDING.

The mould is 12 in. by 7½ in. and ¾" thick made of oak plated with iron. The moulder takes up a lump of clay, and works it by hand into an oblong square, somewhat less than the mould; the mould is placed upon the bench, and fine coal-dust or sand thrown into it. The lump of clay is taken up in the right position for the mould and is thrown with a considerable force into the mould placed upon a bench being dusted with sand or coal; then the surplus clay is cut off by means of a steel wire. The surface of the tile is then rubbed with a wooden tool to make it smooth. The finished tile is next taken out of the mould. In this manner the tiles are moulded. The raw tiles are next dried in the sun or otherwise and are burnt in the manner already described.

BLEACHING & DYEING JUTE.

THE question of bleaching jute without injury has been studied for a long time. All bleachers have boasted of being able to bleach it as well as, or even better, than linen and hemp, but all have found that the bleaching was more apparent than real, and that the goods after lying some months in the warehouse, turned from white to yellow. Several manufacturers, for want of anything better, have been content with giving the jute a cream shade, and for this purpose they make use of rollers over which the hanks are hung, so that their lower ends dip into a weak chloride bath, very slightly warmed, for 30, 40 or 50 minutes. The hanks are then passed into water, pressed and dried in the air.

The treatment of jute by complete submersion, air being excluded, is the safest. Treatment in the roller with the intervention of air is the most dangerous. The reason of this is that in the former case the bleaching is a slow oxidation, whilst in the latter it is the result of the rapid and energetic action of hypochlorous acid. It has been tried, but without much success, to use silicate of soda and chloride of soda; chloride of lime is preferable. But to get good white it is necessary to steep the jute alternately in a soap bath and in a solution of chloride of lime. The following are directions for a so-called cream shade: Immerse in a weak and luke warm soap-bath for about 10 minutes; after draining, immerse for 40 minutes at most, in a bath of chloride of lime, not making more than $\frac{1}{2}$ " in the chlorimeter.

The duration of the immersion may be variable, the quality of the jute and the shade which it is wished to obtain being the best guides. As for whites more decided than cream shades, they are produced in the same manner, but the duration of the steepings in the soap lye and the chloride of lime is shortened, and these operations are repeated several times in succession. Whatever may be the shade at which the process is brought to an end, it is well to finish with two washings, the one in luke warm and the other in cold water. The jute is then drained and dried at as low a temperature as possible. It is recommended that during the steeping process the jute should be regularly but gently agitated, taking care not to bring it above the surface of the liquid.

According to SCHEURER, bleaching powder was at one time considered suitable for jute bleaching, but it was soon found that this reagent made the yarn hard and brittle, likewise removing, along with a portion of its solidity, that silky brightness which constitutes one of its principal merits. Hypochloride, on the contrary, by reason of the more rapid and uniform oxidation which takes place, can be employed at a high degree of concentration without the resistance of the fibre being impaired. Its action has however, to be regulated with care, on account of its powerful properties as a reagent. Bleached jute would suffer by being plunged into a concentrated solution of hypochloride of soda, while such is not the case with jute in the unbleached

state, in which the cellulose is protected in the earlier stages of the operation by the encrusting substance. It is the latter portion of the process which is usually found to affect the solidity of the textile substance under treatment, even when the solution has not been a strong one. Therefore, Scheurer considers that, to save the fibre from the corrosive action of the hypochloride, it is necessary to diminish the force of the reagent, as the operations succeed each other, and to preserve a certain relation between the degree of concentration of the oxidising liquid, and the quantity of the encrusting substance which remains to be destroyed. In this way a satisfactory white is obtained.

According to a patent taken out by T. G. Young, the jute is first soaked in a solution of a sulphide of an alkali, or alkaline earth, till sufficiently softened. It is then washed and submitted to a bleaching agent composed of a solution of chlorine and an alkali, other than chloride of lime, such a chlorine and soda, until the desired bleaching results are obtained.

The following methods of bleaching jute yarn, as carried out in the Dundee district, are given in *A Manual of Dyeing*.

The hanks are sorted into bundles of from 6 to 8 cwts., suspended on wooden rods, and immersed in a tank containing water at 80° to 100°F., with the addition of 120 gallons of a bleaching powder solution at 8°Tw.

The yarn should be entirely immersed in the liquor and moved from time to time. After the hanks have been immersed for about 1 hour, the liquor is

run off, the hanks are allowed to drain and they are then washed, and soured for $\frac{1}{4}$ to $\frac{1}{2}$ hour in another tank, with the addition of 1 gallon of sulphuric acid, 144°Tw.

The hanks are finally well washed in water.

The result will be a half bleach; for a full bleach the material is immersed a second time in bleaching powder solution, using 80 gallons, without previous souring.

Another method consists in making the yarn into bundles of about 10 cwts., which are usually treated in three tanks. The first tank contains bleaching powder, 15 to 20 per cent. (calculated on the weight of material), the second 10 to 15 per cent. and the third 5 to 10 per cent.; the yarn is allowed to remain in each tank $\frac{1}{2}$ to $\frac{3}{4}$ of an hour at a temperature of 120°F. It is then washed and soured for $\frac{1}{2}$ hour with sulphuric acid at 1°Tw.; finally washed and dried.

A. Busch, *Mittheilungen des k.k. technologischen Gewerbe-Museums*, Wien, 1900, recommends the following method of bleaching jute:—

1. Steeping of the jute in lukewarm water overnight.
2. Washing.
3. Boiling for $\frac{1}{2}$ hour in a solution of soda ash. 5 lbs per 100 gallons. Wringing, washing.
4. Steeping for 10 hours in a solution of bleaching powder at $\frac{3}{4}$ °Tw. Wring evenly.
5. Souring, $\frac{1}{2}$ hour to 1 hour, steeping in hydrochloric acid $\frac{3}{4}$ °Tw. Wringing and washing.
6. Steeping for 1 hour in a solution of potassium permanganate (2½ lbs. per

100 gallons of water). Wringing and washing.

7. Steeping for $\frac{1}{2}$ hour in a solution of sodium bisulphite (8 gallons of bisulphite at 72°Tw, per 100 gallons). Thorough washing.

8. Blueing with Methylene Blue, Methyl Violet, Water Blue, Ultramarine, etc.

In order to obtain a softer feel the jute is finally soaped for ten minutes in a warm solution containing 5 lbs. of soap per 100 gallons of water. The soaping and blueing may be carried out in the same bath.

Cross and Bevan's method of bleaching jute pieces is carried out in the following manner:—

1. The pieces are treated for 2 hours, at 160°F., in a solution containing 5 lbs. of sodium silicate per 100 gallons.

2. They are then treated for 2 to 2 $\frac{1}{2}$ hours with a solution of sodium hypochlorite containing 0.7 to 1 per cent. of available chlorine.

3. This is followed by a treatment with hydrochloric acid, $\frac{1}{2}$ °Tw., to which a small amount of sulphurous acid has been added. After this, the goods are well washed and dried.

Soak the jute from 12 to 24 hours in warm water and then pass it through a hot soap bath. Then rinse, wring and put in a bath of hypochlorite of sodium marking 2° Beaume. This bath may be made by dissolving equal quantities of bleaching powder and soda ash separately, mixing the solutions and allowing the product to stand; then by decanting the clear liquor from the precipitate and diluting with water until the proper strength is obtained, viz., 2° Beaume.

The jute must be left about 3 hours in this bath and then lifted and scoured with acetic acid, after which it is thoroughly rinsed.

JUTE DYEING.

Jute has got the affinity of being dyed in almost any kind of dyestuff, including Acid, Basic, Sulphur, Naphthol AS colours and Vat Dyestuffs available on the market. There are no hard and fast rules for dyeing jute, most of which are akin to the dyeing of cotton or art. Silk, but the following simple facts as summarised below from THE INDIAN TEXTILE JOURNAL which will be of a great help to the dyer:—

(1) Basic dyestuffs will go on to the jute from an acid bath and be fairly fast to light without any mordant being necessary due to the chemical activity of jute fibre towards the dyestuffs.

(2) The acid dyes are used on to the jute fibre with the addition of alum and Glaubers Salt.

(3) Auramines of the Basic class of dyestuffs should not be dyed beyond 140°F., as they very easily decompose into a dirty mass if the temperature is raised beyond this.

BASIC DYESTUFFS.

The dyestuffs is mixed with a little quantity of acetic acid and carefully dissolved in boiling water. The solution so obtained is added to the dyebath, with about 5 per cent. of acetic acid and 5 per cent. of alum. The dyeing is started cold and the steam is opened afterwards, if it is necessary to bring the dyebath to the boil for complete exhaustion. but all this depends on the local circumstances. The material should not be immediately lifted out but be allowed to remain in the bath

until it cools down. If the penetration is not thorough and good, more acid and alum to the extent of 10 per cent. may be added. After the dyeing has been completed, the goods are rinsed in cold water and dried.

When a fairly good fastness to rubbing and washing is desirable the goods after being dyed are treated with a 1 per cent. solution of tannic acid in a luke-warm bath for a few minutes and then passing forward without any rinsing for drying. All the Basic dyestuffs which are applicable to cotton can be used on jute also and their method of dissolving is also the same. Basic dyestuffs produce very bright shades in dyeing and printing.

ACID DYESTUFFS.

The application of acid dyestuffs to the jute fibre is very simple and the shades obtained are notably fast to light and brilliant in appearance. For darker shades the proportion of liquor to material is 1: 10 and for light and medium shades 1: 15 or 1: 20. The use of short liquors is recommended because the baths do not exhaust completely and the old standing baths can be used over again for further lots by replenishing it with the dyestuff and chemicals. The bath is prepared as follows with the necessary quantity of the dyestuffs:—

2½ per cent. Alum

or

10—20 per cent. Glaubers Salt.

(These quantities are calculated on the weight of the material).

Enter the material in a luke-warm bath, then bring it to the boil and work for three-quarters of an hour. Shut off the steam and further work the material for 30 minutes more as the bath cools down. No rinsing being necessary the material is lifted out and sent forward for drying.

The dyeing is best carried in wooden vats but if it is to be done in the copper vessels a little quantity (about 4 oz.) of Ammonium Sulphocyanide may be added to impart brilliant shades.

DIRECT DYESTUFFS.

Unlike other vegetable fibres, the dyeing of jute with direct or substantive dyestuffs is carried out in a very simple manner. The material is thoroughly wetted out before entering the same in the dyebath. A very short bath is prepared with about 12.25 per cent. common salt, the material is entered and dyed at the boiling temperature. For better exhaustion and even penetration, it is advisable to finish off the dyeing in the cooling bath. The direct dyestuffs, on the jute fibre are fairly fast to washing and rubbing. With some of the direct dyestuffs, where better exhaustion and even penetration is difficult, the addition of about 12 per cent. of sodium carbonate will serve the purpose.

SULPHIDE DYESTUFFS.

Where the shades are required possessing the best fastness to light and water, etc., which need not be of special brilliance, sulphide dyestuffs are used. They have no rivals possessing the same properties and yet they are economical, and may be recommended for the jute industry.

Like cotton, jute is also dyed with sulphur colours in a bath of dyestuff, sodium sulphide and Glaubers or common salt. The dyebath is prepared with the afore-mentioned ingredients and brought to the boil. The steam is now shut off and the dyeing carried in the cooling bath for one hour. After the dyeing is complete, the material is lifted out of the dye vat and rinsed first in cold water and then in hot water. Sometimes when it is desired to produce brightness, a treatment with an oil emulsion is given, after which the material is taken out of the vat without rinsing and sent forward for drying. As in cotton dyeing, in the dyeing of jute also, the same dyebath of sulphur colour can be used over and over again by adding the necessary requisite quantities of dyestuff, sodium sulphide and salt.

CULTIVATION OF POTATO.

THE great importance of the potato as a human food in all the countries having temperate climates is now more fully appreciated than even before. The role that this crop played in the last Great War especially in Germany and Austria, may never be fully realized outside of these two countries themselves. Naturally, crop of such great economic importance as the potato, and one having such a wide adaptation to the soil and climatic conditions, involves many problems and has many enemies in the shape of insect and fungus pests with which to contend.

In this article it is our aim to discuss the basic principles underlying the production of potatoes.

ROTATION.

Potato is usually cultivated in Bengal after jute, or maize, or Aus paddy or in tracts of country where the potato is the principal crop, it often forms the only crop of the year. In parts of Behar, in the plains of Northern India, and in Khasi hills two crops of potatoes are taken from the same land in one year. There is a common notion in this country that potatoes do well grow on the same land year after year. The texture of the soil is no doubt rendered fitter and fitter for the potato crops by the cultivation operations done for this crop, but insect and fungus pests predominating prove the injuriousness of this system after a few years. It is best to grow sun-hemp, between June and August and plough the crop in, August or September. The green manuring adds considerably to the growth of potatoes. Lime and fresh

ashes should be used if Green manuring is done to hasten the decomposition of the manure and prevent insect-pests.

VARIETIES.

There are several varieties of potatoes grown in different parts of India. The Patna variety with red skin gives a better yield than the Nainital variety, and the popularising of the Patnai potatoes would be an improvement. A Madras variety is also very prolific, but it does not keep so well as the Patnai or the Deshi.

SOIL

The most suitable soil for the cultivation of potato is the sandy loam of a fine texture but not clay loam. Such soil, if it contains a good deal of humus matter, which makes it retentive of moisture, is best suited for the crop. Shallow, sandy or sting soils and heavy clay soils, are not suitable for potatoes. Sandy soils improved by the admixture of pond or river silt answers very well.

PREPARATION OF THE SOIL.

In the cultivation of potato deep ploughing and thorough pulverizing of the soil are essential. Two ploughings and two cross-ploughings with an improved plough followed by one grubbing with a fine-lined grubber and one cross-grubbing should be done as soon as the rainy season is over, the 3 series of operations being conducted at intervals of one week between the operations. Then should follow one or two harrowings for collecting weeds. After harrowing the land it should be brought to seed bed level by means of ladder. The land is next prepared for irrigation before sowing is

done, as the making of irrigation channels after sowing uproots a number of seed-tubers. The field is first divided from its head, or main channel for irrigation, to its bottom, into a number of long strips 6 ft. wide, separated by water-channels about a foot wide, leading from the main channel at the head of the field to the bottom. The strip of land 6 ft. wide should then be divided into ridges and furrows 18 inches from one another. The ridges should be made in such a manner that they are at right angles to the main irrigation channel.

SOWING.

Along these ridges 6 ft. long and 18 inches wide, potatoes should be planted in double rows 6 inches apart during September and October, 6 inches from one another and 4 inches deep. This is a tedious operation, one man makes a straight channel 4 to 5 inches deep with a narrow spade along each furrow and between two adjacent ridges. Another man then puts in two rows of pickled potatoes 6 inches apart both ways, and covers up the channel as he goes on, following the man who is making the channel, while a third man goes on putting manure along the covered channels only. Instead of spreading the manure all over the field this will be found a more economical way of using the manure.

MANURING.

As potatoes are benefitted by high manuring, good manure may be used. One of the following manures is recommended for use:—

I.

Bone meal	6 mds.
Castor cake (powdered)	18 "

The mixture is sufficient for manuring 1 acre of land. It may be applied immediately after planting.

II.

Rotten cowdung	400 mds.
Ashes or lime	15 "
Castor cake	15 "

In this preparation rotten cowdung must be applied before planting to ensure better yield. The remaining two substances are mixed together and applied after planting.

IRRIGATION.

Whether the plants all come out within a fortnight or not, the first watering should take place within 10 days to a fortnight after planting, unless a good shower of rain makes this watering superfluous. The tardy sprouts will come up after the watering. If seed-potatoes are kept in-doors under a heap of moist straw or over damp sand for a week or ten days before planting, the sprouting will be quicker and more even after planting. Instead of flooding the field or running the water along the channels in which the seed potatoes are imbedded, it is best to run the water along channels between the rows of potatoes, or to distribute the water from the channel by means of an irrigation spoon. This prevents caking of the soil. But if the water is run, along the channels in which the potatoes are imbedded hoeing should be done within a week after the irrigation to allow the sprouts to come up without resistance. The first earthing up should take place when the plants are 6 to 9 inches high. Then should follow two watering at the interval of a fortnight and then the second earthing. If the soil looks dry, irrigation

should take place before and after the two earthings at shorter intervals, say, once in 10 days. Three to six irrigations are necessary, according to the nature of the locality and of the season.

LIFTING

When the leaves and haulms are dried up completely and the land becomes quite dry, the potatoes are ready for lifting usually it takes three months to get matured potatoes for harvesting. This lifting is best done with the Hunter hoe unless a potato-digging plough is employed. Perhaps a slightly larger proportion of tubers gets cut when the hoe is used than when spades are used. 100 maunds to 150 maunds per acre is a fair outturn, though as much as 300 maunds per acre are sometimes obtained.

PRESERVATION OF SEEDS,

It is difficult to preserve the seed of the superior and large sized hill potatoes in the plains, and one of the chief obstacles to the spread of the cultivation of the Nainital potatoes has been the high price that has to be paid for the imported seed at the time of sowing. If each cultivator could store his own Nainital potato-seed there would be no occasion to grow the inferior Deshi varieties. The following plan as given by N. G. Mukherjee in his "Handbook on Agriculture" may be tried.

In a dark but well ventilated room erect shelves in which sand is to be spread and the potatoes spread one deep on the shelves. Ten or twelve shelves may be arranged one above another on a stand. All rotten potatoes must be weeded out and the seed-godown examined constantly for this purpose. Small sized potatoes keep better and those that

come from near the surface of the ground. Only the dry places are suitable for preservation of seeds.

HACKSAW-BLADES.

THIS is an industry, which can be easily started in India, because it is a so-called "easy article." For this industry no expert and no specially trained labourer is required.

The hacksaw blade manufacturing is not absolutely full automatic, but if the machines are set once, they will work for weeks without any change, and everybody, even girl or young boy, can operate this machines.

On the other hand this industry is very fine, because the machines can also be used for different articles, and, if a larger output is required, only new machines have to be installed.

The raw material is band steel (cheap or good quality) which is delivered in coils from appr. 50 Kilo (one hundredweight).

For cutting the hacksaw blades in lengths a good automatic eccentric press is required, which can be set from appr. 8 to 16 inches length. This press does not cut in lengths only, but the press also cuts the head round and punches the holes and has automatic feeding.

The next operation is to cut the teeth, which is done under a milling machine. The miller can be supplied with different teeth according to the requirements of the customers. The miller is usually divided in three parts, and this is done (1) because it is easier to manufacture and (2) because some hacksaw blades have smaller and bigger teeth. This is done in that way, that in

the beginning and at the end are fine teeth and the teeth in the middle are coarse. It gives an easy start and still with the coarse teeth a quicker cut.

Now the next operation is the setting of the teeth, which is done under the press described above. A special little wavy apparatus is required and the feeding is done by hand. After this the blade is actually finished and need only to be hardened.

For the hardening a special machine is required, which has two little flames (gas and oxygenous) and just behind this, two little oil beams, which cool the heated material at once.

Now the blade is absolutely finished and ready for use. Some people sign the finished blades with their own or with the customer's trade mark. This is done on a special little machine or a little hand press.

The difference in hacksaw blades is first of all the difference in the material, then single or double, and blades for machines or hand use. India is the biggest market for blades 12 inches long $\frac{1}{2}$ inch wide single from a low quality steel.

The machines described have an output in a month from appr. 300000 blades. One mistry and two ordinary labourers are required. The price for the complete plant will be appr. Rs. 11,000 (eleven thousand rupees only). One dozen blades will cost appr. including material, every expenses depreciation of the machines appr. Rs. $-\frac{3}{2}$. Every body who is interested in this article, should inquire the price and demand in the wholesale market, so that he can calculate the profit for himself.

To be successful, the machines certainly have to be set up from some one, who understands the line very well and who can show the mistry everything and who can still look after the machines for special matters, which may occur from time to time.

Therefore the machines should only be ordered by a firm or individual, who is able to set up the plant and to look after it afterwards, if necessary. Certainly many firms will say: "oh yes, we do that for you," but cannot do it and only want to make the profit on the machines.

If anybody is interested in this line, he may communicate with the author of this article through editor of the "Industry," Shambazar.

—By CARL OHMES.

THE PRESERVATION OF SHEEP-SKINS FOR STORAGE.

(From the Laboratories of the British Leather Manufacturers' Research Association).

SHEEP and lamb pelts are imported into this country in great quantities every year. The usual method of preserving these pelts during transport is by pickling in liquors containing acid and salt, writes Winnifred B. Pleass, Ph.D., A.I.C. in LEATHER WORLD. Sulphuric acid, being strong and cheap, is almost universally used and common salt is added to prevent the skins swelling unduly in the presence of the acid. The older method of pickling was to plump the skins in a sulphuric acid bath and then to pass them on to a brine bath to reduce the plumping. To-day the delimed skins are paddled in a liquor containing a mixture of sulphuric acid and salt. The

modern method has the obvious advantage of avoiding heavy plumping in the acid bath.

PICKLING IN LIQUORS CONTAINING SULPHURIC ACID AND SODIUM CHLORIDE.

With a well controlled pickling process it is possible to preserve skins in good condition even during long periods of storage by using only sulphuric acid and salt in the pickle liquor. The range of concentrations of both acid and salt in the pickle liquor, which will efficiently pickle pelt, however, is rather narrow and various defects may become apparent on the goods, especially after prolonged storage, if the composition of the pickle liquors has been allowed to depart far from the optimum. Both acid and salt inhibit the growth of micro-organisms and, therefore, sufficient acid and salt should be taken up by the skin to prevent the skin putrefying or becoming mouldy. It is seldom that commercial skins have been pickled so badly that they become putrid during transport or storage, but the appearance of a skin decorated with coloured patches of mould stains is all too familiar to the tanner who uses pickled sheep-skins. In fact, of the obvious defects due to inefficient pickling, mould growth on the skins is probably the one which causes the tanner most annoyance. The air contains the spores or seeds of many species of mould which will begin to grow on coming in contact with a moist pickled skin which has not taken up sufficient acid and salt during pickling. In the early stages of growth, the mould can be brushed from the surface of the pelt, leaving little or no stain. As the

growth proceeds, however, the mould sends out hyphae or root-like growths which penetrate into the skin. The mould uses the proteins of the skin in its metabolism which results in damage to the fibre structure of the pelt. Pigments may also be secreted and leave permanent staining. These stains are difficult to mask and usually render the skin useless for dyeing pale shades. Thus it is very important that sufficient acid and salt should be taken up during pickling to prevent the growth of mould on the skin. If, however, an excess of acid or salt is taken up, other defects may become apparent on storage. An excessive amount of acid causes the skin to darken on storage, and if the temperature of storage becomes raised the collagen of the skin is attacked chemically, leaving a brown slimy tender pelt which exudes fluid. If the concentration of acid has been only slightly in excess of the optimum or if the concentration of salt in the skin is high, the appearance of a section of the pelt under the microscope shows that some irreparable damage has been done, even though the damage is not sufficient to be seen from a macroscopic examination of the pelt.

It is essential for efficient pickling that the concentration of both acid and salt shall be controlled. A deficiency of acid cannot adequately be compensated by an excess of salt.

In the laboratory the optimum concentrations of acid and salt in the pickle liquor before and after use have been worked out. In a works, however, the difference between the composition of the pickle liquor before and after use is usually much greater than in the labora-

tory experiments. In a works, the concentration of acid and salt in a pickle liquor after use should be controlled at about 8 lbs. of sulphuric acid and 100 lbs. of salt per 100 gallons of used pickle liquor. The initial concentration of acid and salt which will fall to these concentrations after a pack of goods has been through the liquor will vary from works to works, depending on such factors as the degree of deliming the goods receive before pickling, the proportion of pickle liquors to goods, the length of time of pickling and the amount of agitation the goods receive while being pickled. Thus in each works it will be necessary to decide the desirable initial composition of the pickle liquor by a system of trial and error.

The usual method of controlling pickling in a works, after having discovered the desirable initial composition of the pickle liquor, is to titrate the used pickle liquor for acid and chloride content, and then to add acid, salt and water to the used pickle liquor, sufficient in amount to bring the liquor back to its original composition. The liquor is then ready to receive another pack of goods. The renewal of the liquor, of course, should not be continued *ad infinitum*. From time to time all the old liquor should be thrown away and a fresh charge made up.

There is one practical point which is worthy of consideration and that is the possibility of the wood of the cask absorbing so much acid from the skins in contact with the side of the cask that the mould growth becomes possible on these skins. A paper in the J. A. L. C. A., 1934, Vol. 29, p. 113, by Stuart and Frey, deals

with this problem. They have shown that the wood of the casks will absorb as much as 9.6 per cent. of its weight of sulphuric acid when in contact with pickled skins. They suggest that a simple method of preventing this trouble is to soak the casks with pickle liquor before pickling the skins. The amount of acid absorbed by the wood of the cask, is, however, not likely to be great enough to increase the pH value of the pickled-skin in contact with the cask sufficiently to allow of mould growth, unless the concentration of acid in the pickle liquor was appreciably below the optimum.

THE CHEMICAL EXAMINATION OF SHEEP-SKINS PICKLED IN LIQUORS CONTAINING SULPHURIC ACID AND SODIUM CHLORIDE.

The proportion of sulphuric acid and salt in a satisfactory pickle liquor has been considered, but a problem more often encountered by sheep-skin tanners is that of the examination of a pelt which has been bought in the pickled condition. In a works it is often necessary to decide which deliveries of pickled pelt will remain in good condition on prolonged storage and which casks had better be put into work as soon as possible. In addition, if the skins have been pickled or re-pickled in the tannery, it is very convenient to be able to test a sample of skin chemically in order to decide whether the pickling has been efficient. If the raw skins were in a good condition prior to pickling it is usually impossible to detect any inefficiency in the pickling process either by macroscopic or microscopic examination of a freshly pickled skin. Chemical examination of the pelt, however, enables the probable behaviour

of the skin on storage to be predicted. The pH value of the aqueous extract of the pelt and the sodium chloride content of the pelt are the two analytical determinations which should be made. Full details of the methods are given in the J. I. S. L. T. C., 1934, p. 476. It has been found that all skins which have been efficiently pickled, i.e., skins which have shown no obvious defect after prolonged storage in unfavourable conditions, give analytical figures which lie between fairly narrow limits. The pH values of the aqueous extracts of the pelts range from 2.0—2.4, while the salt concentrations lie between 0.3 and 0.7 grams of salt per gram of collagen. The chemical examination of pickled skins has been most useful and reliable for predicting the keeping qualities of pickled pelts. Mould growth, probably the most common defect due to inefficient pickling, occurring on pelts can readily be predicted by this method.

PICKLING IN LIQUORS CONTAINING ORGANIC ACIDS.

Work in the Research Association's laboratory and also the examination of trial of commercial skins have shown that efficient pickling can be carried out in liquors containing sulphuric acid and sodium chloride alone and that mould growth on the skins during subsequent storage can be entirely suppressed. Efficient pickling, however, requires very careful control, and other methods of suppressing mould growth are available and can be adopted in practice.

It is well known biologically that certain organic acids, by virtue of the greater ease with which they penetrate the living cells of the micro-organisms,

are better fungicides than the stronger mineral acids. Acetic, benzoic, formic and salicylic are four of the fairly cheap organic acids which possess fungicidal and disinfectant properties. The use of acetic acid in the form of vinegar for domestic pickling is very old. Benzoic and salicylic acids are also used as preservatives in foodstuffs while the anti-septic properties of formic acid are well known. As long ago as 1904, Seymour Jones recommended either formic or pyroligneous acid (crude acetic acid) as a substitute for sulphuric acid in pickling sheep-skins. Seymour Jones, and later Drake and Lamb, found that satisfactory pickle liquors could be made by substituting all the sulphuric acid in the pickle by formic acid. The use of organic acids was not taken up commercially because of the considerably greater cost of the organic acid over the cost of sulphuric acid.

More recently, however, Irvine Blank (J. A. L. C. A., 1932, p. 390) has met the objection of the cost of organic acids by suggesting that sulphuric acid should be used in addition to an organic acid. Blank has shown that mixtures of sulphuric acid, sodium chloride and sodium acetate form efficient pickle liquors which prevent the growth of very resistant moulds. In this laboratory, a number of pickle liquors containing sodium chloride and organic acids with and without sulphuric acid have been investigated and it has been found that these organic acids will prevent mould growth far more effectively than sulphuric acid alone. Pelt pickled with sulphuric acid and salt may become mouldy on storage if the pH value of the aqueous

extract is above 2.4. Pelt pickled with acetic acid and salt, however, did not become mouldy although the pH value of the water extract of the pelt was as high as 3.3.

Formic acid may be used either with the salt alone, or in conjunction with sulphuric acid in the pickle liquor. About 2 per cent. of formic acid together with 10 per cent. of salt (calculated on the liquor) may be regarded as a satisfactory pickle. After pickling in such a liquor, the pelt will remain free from mould on prolonged storage, but will not be of quite such good quality if the temperature of storage becomes raised as similar pelt which had been pickled in a liquor containing the optimum concentration of sulphuric acid and salt. Higher concentrations of formic acid in pickle liquor definitely detract from the general quality of the pickled pelt.

Acetic acid and salt alone do not form a suitable pickle liquor. Mould will not grow on pelt which has been pickled in liquors containing between 2 and 5 per cent. of acetic acid and 10 per cent. salt, but after prolonged storage, especially if the temperature becomes raised, the microscopical appearance of sections of the pelt is poor. The fibres of the corium are not well defined and the general microscopical appearance indicates that the pelt has definitely deteriorated during storage. When, however, both acetic and sulphuric acids are used in the pickle liquor, the mould growth on the pickled pelt may be prevented and the good microscopical appearance of the pelt preserved even during prolonged storage in warm conditions. Concentrations of both sulphuric and acetic acids

between 0.5 and 1.0 per cent. together with the 10 per cent. of salt, are suitable concentrations for use in pickle liquors. Similarly, salicylic and benzoic acids may be added to prevent mould growth and preserve the good general quality of the pickled pelt during storage.

THE ADDITION OF FUNGICIDES TO PICKLE LIQUORS.

Organic acids were not used thirty years ago largely because of the cost. To-day the cost of these organic acids is not prohibitive on a practical scale, but we have other means of ensuring the prevention of mould growth at an even lower cost. Certain chemicals when used in exceedingly low concentration are very potent fungicides. Among these, *p*-nitrophenol, *B*-naphthol, trichorphenol, and a mixture of *o*., *m*. and *p*. cresols, sold commercially as "Anti-Gallic" merit special mention.

The addition of a small quantity of one of these substances to a pickle liquor will suppress mould growth on the pickled pelt during subsequent storage. The damage to the fibre structure which occurs when mould is allowed to grow on the pickled skins is accompanied by a rise in pH value of the aqueous extract of the pelt during storage. If, however, a small quantity (about 5 lbs. per 1,000 gallons) of one of these fungicides is added to a pickle liquor which is deficient in acid, mould growth on the resulting pickled pelt will be suppressed, the good fibre structure of the pelt will be preserved and the pH value of the aqueous extract of the pelt will remain virtually constant during subsequent storage of the pelt. It is not suggested that the pelts should be pickled in liquors deficient

in acid, but rather that the optimum conditions of the acid should be aimed at and that the disinfectant should be added to the pickle liquor in order to safeguard against mould growth developing owing to any unavoidable fluctuations in the composition of the pickle liquor. Irvine Blank has also recommended the addition of *p*-nitrophenol to pickle liquors in order to ensure against the growth of acid-resistant moulds on the pelts during storage. *p*-Nitrophenol is a very efficient fungicide, especially in acid conditions.

THE STORAGE OF PICKLED PELT.

From the work in the laboratory the importance of the temperature of storage of the pelts has become increasingly obvious. If pelt has been efficiently pickled it should be able to withstand any temperature up to 37° C. (98° F.) without developing any obvious macroscopic or microscopic defect. In the laboratory the ability of pelt to withstand storage at 97° F. for three months has been considered the criterion of efficient pickling. It must be pointed out, however, that a pelt which has to withstand this temperature for a long time never has the pure whiteness of a similar pelt which has been stored at a low temperature. When, however, the pelt has not been pickled in the optimum conditions, any defect which develops on storage becomes more pronounced the higher the temperature of storage. Acid damage, as would be expected, is very definitely more pronounced at high temperatures. Micro-organisms, such as putrefactive bacteria and mould grow more slowly at low temperatures and the damage to the fibre structure of the pelt which attendant on mould growth is far less pronounced at low temperature. During transit through the

tropics, pickled skins will undoubtedly have to encounter high temperatures, but as soon as the pelts are received at tanneries in this country they should be stored in the coolest place which is available, in order to minimise the risk of deterioration of the pelts.

Both from the laboratory work and from the examination of commercially pickled skins, it has been proved that efficient pickling can be carried out in liquors containing sulphuric acid and sodium chloride only. It has also been shown that the addition of certain organic acids or a very small quantity of certain disinfectants to the pickle liquor will prevent the growth of mould on the pickled pelt should the composition of the pickle liquor inadvertently depart from the optimum conditions.

THE HINDUSTHAN REVIEW of September, 1935 writes:—The Industry Year Book and Directory is a reliable and useful book of reference on all matters pertaining to Indian trades, commerce and industries. The current edition (1935) has been thoroughly revised, and has had new additions made. Sections are devoted to the banking and insurance business, agricultural and mineral resources, factory and cottage industries, and chemical industry research. The Directory section has been brought up-to-date, and the lists have been thoroughly overhauled. Altogether, the Industry Year-Book and Directory, by giving a mass of statistical and useful information relating to the industry and commerce of the country, is an indispensable work of reference to those engaged, or interested, in the industrial development of India.

ENCLOSURES IN PACKAGES.

ATTRACTIVE wrappers or containers are the outstanding features of all branded products that command a big sale in the market. The manufacturers and the distributing agents fully acknowledge the commercial value of this and do not spare any pains to present this products in as decent and dignified a shape as possible.

Enclosures in wrapping with goods also are coming into vogue and few packets of popular articles are now-a-days without them. These may be in the form of leaflet or pamphlet. But the full value of these is not still completely appreciated by the manufacturers.

Remember that these may be made to serve the purpose of increasing the popularity of the product, or of extending the sales of other lines made by the firm concerned and it is no exaggeration to say that the preparation of printed matter for enclosures is too important in sales promotion to be lightly overlooked.

One firm of food manufacturers is for ever experimenting with new methods of packing and new forms of printed enclosures. They find that, just as with their Press advertising they have to make frequent changes not only in "copy," but in the style of their selling appeal, so printed enclosures in packets and containers must be altered in size and appearance—and, just as important, in colour at intervals, in order that their use may be fully justified.

HOW ONE COMMODITY INTRODUCES ANOTHER.

It is their invariable custom to use one commodity as a means of introducing

another, and for this purpose, sample forms are enclosed inside each wrapping. This method has proved very satisfactory in more than one way. For one thing the firm has used it as a means of making one product advertise another. The changes also provide effective tests as to whether or not the printed enclosures are read, and what form of matter brings the best results.

An enclosure which merely repeats the name of the goods or shows a picture of the trade mark, or which is just a replica of what is on the outer cover, is really so much waste paper, and the expenses of printing and inserting it might just as well be avoided. Some food products, domestic necessities, manufacturers are finding it worth while to follow the example of the cigarette makers by enclosing small pictures or cards inside the wrapping, thus enlisting the aid of the younger client in the household to popularise their products. But it is not only in connection with the smaller types or branded commodities—polishes, cigarettes, chocolates, and the like—that the message sent out in this way can help the sales.

GREAT AID IN MAINTAINING CONFIDENCE

Paint and enamel, manufacturers, makers of office and domestic equipment, hardware and ironmongery manufacturing houses, small machinery specialists, and other producers have found the printed enclosure a great aid in creating and maintaining the public confidence in their brands and products.

In days of highly-paid labour many men do their own house decorating and exterior renovating, and this has increased the public demand for such things as tolls, pains and varnishes. In the past, such goods were sold in bulk to the trade; but now new methods of packing and wrapping are necessary and those firms which are prepared to provide explanatory matter with their goods, or a booklet explaining the way to get the best results, are the people who are getting the repeat orders.

HOW SALES ARE OFTEN LOST.

A retailer explained recently that he has many complaints from users of a well-advertised brand of enamel, because the stuff dried "patchy." He said that it was merely due to the fact that users did not apply it properly, and, in order to prevent further complaints, he now made a practice of explaining to each purchaser the right way to use the enamel. In this particular case, no instructions were enclosed with the tin of enamel, and, unless all retailers stocking this line took the same interest in customers' requirements as this trader, who went to the trouble of explaining fully to each purchaser how the enamel should be used, it is probable that the manufacturers lost quite a lot of sales.

The experience of this man demonstrates very forcefully the importance of enclosing instructions of explanatory matter with any kind of product the method or the purpose of which is not perfectly obvious to the uninitiated. It is imperative, too, that the leaflet or booklet on which the details are printed shall be folded in such a way that it cannot possibly be overlooked. The

matter should be as brief and concise as possible, and might well be followed by a short selling talk on other allied lines made by the same firm.

HOW TO GET THE ENCLOSURE READ.

A problem which faces the manufacturer is how to get the enclosure read. Many firms find it a good plan to direct the consumer's attention to the printed matter inside by means of a prominent notice in a distinctive colour on the outside wrapper. "Read the condition of Free Gift Scheme in the leaflet round the box," "Study the directions for use given inside the wrapping," "See particulars on back of wrapper," are injunctions now being used.

Generally speaking, the main function of the printed enclosure should be to explain fully the various uses and purposes of the product in connection with which it appears, and the correct method of adapting it to its purpose. Thus, by helping to get a particular proposition used to the fullest advantage, the enclosure is one way of assuring that the product gives the purchaser confidence and satisfaction.

OPENING FOREIGN CORRESPONDENCE.

IN OPENING correspondence with a given foreign market either of two methods may be chosen; a number of identical (circular letters) may be addressed to several or all the good houses in that market of whom the manufacturer may hear, offering to all the same terms and the same goods; or one, only, special letter may be written to that one house in the market in question which information obtained indicates as that house ap-

parently most desirable as an exclusive or chief connection there for the manufacturer's goods. Both methods have their advocates. Let us now consider the latter plan, that of addressing one house only in a market.

To study the personnel of a market, determining the relative importance thereof the several importers and merchants assessing the probable or apparent advantage of each to the manufacturer's goods and policies, is obviously good policy in any event. Picking out the one house which seems most to be desired, introducing oneself only to that house in the effort to establish one's line in his market may very likely postpone for a time the introduction of the goods. The house addressed may not be interested; it then becomes necessary to approach a second choice on the list in the same market, perhaps later a third and a fourth choice. When however the line is finally placed the manufacturer knows that he has placed it in the very best hands available to him. Though perhaps slower in results this method finds supporters among those who look beyond immediate order to ultimate development of trade. Circular letters to all possible prospects in a market may result in prompter manifestation of interest on the part of some one, if not one of those most desired.

Selecting only one target for correspondence in a market will still give the Export Department plenty of work, for there are so many markets.

INITIAL LETTER.

How shall we introduce ourselves where we approach a foreign buyer for the first time, if we are writing individual letters one at a time, to prospects who seem particularly desirable? The best of all introductions is certainly that from some of our friends or acquaintances who are already doing business, better yet, have for a long time done business with the prospect. If we can write specifically that Messrs Mehta & Co. of Bombay with whom we are on particularly intimate terms have urged us to offer our goods, or their exclusive control to Messrs Blank & Co., their own speci-

ally valued customer in Germany—that, in consequence, we have made a careful selection from our line and pared down our prices to the last pie, etc. etc.—then we are sure to receive consideration at last. But never ought we say in an airy, indefinite way, that we owe the address of Blank & Co. of Germany "to friends of ours." It is actual acquaintances and business relations of specific friends on which we must, in such cases, depend.

If we cannot gain such an introduction (though one should not be difficult through inquiry and co-operation), then we can declare in our initial letter that we have for some time been making a careful study of the market where our prospect is established, have weighed the relative importance, facilities, advantages, prices, etc. But let us not stultify ourselves by using such phraseology in a number of identical letters to the same market at the same time.

MAKING A RAILWAY CLAIM.

WHEN taking delivery of consignments by railways it is important that the consignee examines his goods immediately they come into his possession. If he goes to the railway station to fetch the traffic he should make a careful external examination of each and every parcel forming the consignment before he definitely accepts delivery, and certainly before he gives a signature as a receipt for the consignment. If on the other hand, the goods are carted by the railway company to the consignee's door, a scrutiny should be made directly the consignments are tendered for acceptance and a careful examination made of the whole lot before any signature is given.

HOW TO PROTECT YOURSELF.

If anything is noticed amiss at the time of arrival, a careful note in accordance with the exact condition of the goods should be made on the railway company's delivery sheet against the consignee's signature so that it cannot afterwards be said that the goods were in per-

fect order when delivered and "nothing is known of any damage or breakage having occurred during transit"—to quote a stock argument.

It is a very good plan whenever it is possible to pass each package over the scale before a signature is given. The reason is obvious. Occasionally a robbery will take place during transit and it will be impossible to detect by means of an external examination that anything of the kind has happened; whereas on weighing the package the irregularity may be discovered. As an instance on the car man's delivery sheet the weight of the consignment may be shown as 20 seers but on scaling the package, it may be found to weigh only 16 seers. This would be quite sufficient to arouse suspicion and would certainly justify a claim if it is discovered on unpacking that a portion of the goods have been extracted.

Many traders fail altogether to protect themselves when either forwarding goods by railway or receiving goods from the hands of a railway company after the conveyance has been effected and then wonder why it is that they cannot secure any compensation from these carriers when anything goes amiss. It is curious, to say the least of it, that whereas a trader will make a careful note as to what are the conditions under which he can secure the very best terms from his suppliers in the matter of discount for example and sees to it that his accounts are paid within the time stated so that he can obtain the allowance thus due to him, the same man will neglect altogether to study how best to secure his legitimate rights from the hands of the big carrying concerns.

FORM OF A CLAIM.

A railway claim like an invoice to a customer for goods supplied, should be fully detailed and drafted somewhat as follows:—

The B. N. Ry. Co, Bombay.
Drs. to Messrs. Blank & Co, Canning House, Bombay.
To value of 30 pairs of dhoties
Stolen in transit from one case ex-Cotton Mills, Nagpur.

Delivered to us this morning
30 pair of dhoties @ Rs. 2-14 per pair
Rs 86-4.

Reference No. C. 519.

Kindly acknowledge receipt of this claim and note—

This confirms our complaint to your carman at the time of delivery.

Of course the claim should be a precise statement of facts that is, it should give such informations as can be verified to any railway official who may seek to check the details without delay; and the footnote should refer to any pertinent fact which will enable the railway company's official to check the statement immediately on receipt of the debit note at the goods station.

It is important that an acknowledgement of each claim should be asked for and that an acknowledgement be obtained. Sometimes it happens that a railway claim will get mislaid or perhaps lost in the post and in such an event, if a reminder is sent to the railway company and the company's agent cannot trace receipt of the original demand, the claimant will probably be told that there is no trace of the original and "at this distant date no liability can be admitted."

TIME LIMIT.

There is no general rule governing the preparation and presentation of each and every railway claim so far as time limit for claims is concerned. All that is possible to say in this connection is that a railway claim should be presented to the company at the earliest possible moment. There are certain rules which are common to all leading railway companies. These allow three to fifteen days' time after the delivery of goods for lodging claims for damages suffered by goods in transit. And many a claim has been rejected by the railway companies because it has not been made within the time specified in this condition.

Strictly speaking, it is the owner of the goods who should make the claim upon the railway company and as, in the great majority of cases, it is the consignee who is the real owner of the goods, it is he who should make the claim.

IN THE INSURANCEFIELD

BY OUR INSURANCE COMMISSIONER.

Future of Interest Rates.

It is well-known how the trend of interest rates is associated with the profits of insurance business. Slight changes in the general interest rate may have preponderating repercussions on the earnings of insurance companies, and while a rise in the same is likely to find the company in a stronger position, other things being equal, a fall may find it in an unfavourable position. A contributor in a recent issue of a Calcutta Insurance Journal, who excites more sensation and consequently confusion than helps conviction, has argued that the trend of the rates of interest earned by the Indian companies during the last twenty-five years justifies the assumption of higher rates of interest at their valuations so that they might yield bigger valuation surpluses. The real position is not so simple as this. The interest rate is such an important factor in the organism of a life office that threadbare theories of the text-book cannot always be applied to the practical administration of funds of such companies. There is a statistical process by which interest rates are anticipated, just as mortality experience may be foretold. Actuaries and financiers, however, take a different view as to interest rates which are more sensitive in the short period and unpredictable in the long run, than mortality rates. For example, people had become so accustomed to a high rate of interest, that the present era of low rates is considered as an abnormality. But respons-

ible opinion has been expressed to favour the view that the existing rates would rule for a longer time than can be reasonably characterised as a fluctuating period. The rate of interest is governed by two factors—the rate of remuneration to be secured for the money and the rate of remuneration for the risk undergone in putting it out at interest.

The Apple-Cart of Investment.

Mr. C. H. Recknall, F.F.A., F.I.A., recently speaking in Manchester emphasised the view that the present era of interest rates was a normal one, and that which obtained after the war was an abnormal one. The brisk employment of capital during the boom period was responsible for an artificial fillip to the interest rates, and Mr. Recknall points out that since the Napoleonic era the rate of interest in England had been around 3½ per cent, something less than the average rate to-day; and in fact it has been gradually falling all over the world. It was difficult to believe, he said, that the future would open up greater demands for capital than there had been during the last hundred years. Mr. Recknall's association with Mr. J. M. Keynes, the reputed English economist, lends particular importance to his observations. Again, Mr. Penman of the Chartered Insurance Institute of London has asked the pertinent question as to the desirability of safeguarding the capital, and the importance attached to the aspect of safety necessarily involves the

yield of a lower rate of interest. This extraordinary importance attached to the safety ideal is prompted by the importation of a new socio-political factor in recent years which places in the hands of a comparatively few individuals the power of upsetting the whole investment apple-cart, perhaps to make experiments with some novel plan for rebuilding the financial world overnight, or juggling with currency with the object of getting the better of trade rivals. In an earlier issue of "Industry," the harmful effects of currency manipulation in England and United States on the investment situation were discussed, and in so far as new factors, absolutely unknown in the past come to dominate the capital market, the methods of forecasting interest rates should be re-orientated. A third factor of considerable moment in the future calculation of interest rates is the difference in the rates of income-tax, a factor depending absolutely on the politico-economic policies reigning at the respective periods of time.

The National Mercantile Insurance Co. (India) Ltd.

We have received a copy of the audited balance sheet of the above company for the year ending 31st December, 1934. The figures revealed therein show that the company in course of this short time has created a life fund of Rs. 11,279-12-8 in addition to a reserve fund of Rs. 4252-0-0 out of net profits of the company amounting to Rs. 9063-4-8, a further sum of Rs. 7,678-4-8 was also carried to the reserve fund. 25% was also offered to the shareholders of the company. Managing agents of the company are Messrs Raha Brothers, 8, Canning Street, Calcutta.

Arya-Sree Insurance Limited.

The company was originally doing business both on the lines of dividing plans and industrial basis, but since the recent change of management, it has practically stopped doing business in

dividing plans and issuing policies on industrial schemes only. During the last few months, the company has recorded business to the extent of nearly Rs. 50,000 (fifty thousands). Managing agents are Messrs. National Mercantile Agency, 19, Strand Road, Calcutta.

The Sanguine Insurance Company Ltd.

The special feature of this company is that any person of either sex aged between 8 to 55 years may take full advantage of the company by taking a policy from Rs. 100 to Rs. 500 without medical examination. Moreover there are provision for children's education or marriage and considerable annuity to the helpless widows. The registered office of the company is at 98-4, Clive Street, Calcutta.

The People Insurance Co. Ltd.

During the year ending 30th April, 1935 the company recorded good business. The company has also introduced various schemes of assurances. The company declared bonus at the rate of 7-8 and Rs. 10 in respect of endowment and whole life plans respectively at the first valuation. The company has opened a branch office at 11, Clive Row, Calcutta.

Bharat Palli Bandhab Insurance Co. Ltd.

The company has been formed to popularise insurance amongst the poor. In order to suit the means of all premium rate has been made as low as possible. Female lives are also insured, chief agents for Calcutta are Messrs. Ghosh Brothers & Co., 137, Canning Street, Calcutta.

The Bangeswari Insurance Co. Ltd.

The above company has been started with the object of offering easy facilities of life assurance to the poor, middle and labour class of people. The company has various schemes suiting to all purse. Loans are granted to the policy-holders on the securities of their policies. Managing agents are Messrs Sanyal & Co., 2, Lyon's Range, Calcutta.

SMALL TRADES & RECIPES

Ringworm Ointment.

Salicylic acid	320	grains.
Benzoic acid	480	"
Resorcin	240	"
Coconut oil	1	ounce.
Lanoline	1	lb.
Mix intimately.		

Tartar Removing Tooth Powder.

Sodium benzoate	50	grams.
Silicious earth	950	"
Erythrosin 3B	1	gram.
Gluside	1½	"
Cassia oil	4	c.c.
Clove oil	8	"
Menthol	3	grams.

Mix and pass through sieves twice to ensure thorough incorporation.

Canvas Shoe Dressing.

Zinc oxide	2	oz.
Pipe clay	4	"
Bleached shellac	3	"
Borax	1	"
Sugar	2	"
Glycerine	1	"
Boiling water	10	fl. oz.

Dissolve the borax in the boiling water, add the shellac. Continue the heat until the shellac is dissolved. Then remove from the fire, add sugar and glycerine; stir in the pipe clay and zinc oxide.

Grafting Wax for Trees.

Japan wax	1	part.
Beeswax	3	parts.
Rosin	8	"
Oil of turpentine	4	"
Hard paraffin	1	part.
Suet	3	parts.
Pine resin	6	"

Melt the waxes along with resin, and while hot add the hard paraffin to it, then stir in the turpentine oil and pine resin and pour the mixture in a stone slab.

Cleaning Playing Cards.

When playing cards become soiled and sticky from much use, they can be renewed to a considerable extent by cleaning with spirits of camphor. This should be applied sparingly with small piece of cotton, wiping each side of the card thoroughly. Afterwards polish the cards with a wad of clean cotton or a soft cloth.

Colouring Electric Lamps.

Shellac	90	grams.
Rosin in powder	30	"
Benzoin	5	"
Methylated spirit	300	c.c.
Aniline dye		q.s.
Mix.		

First clean the lamps with soap water to remove dust and dirt from the surfaces; then make them dry. After this cover them lightly with a layer of white of eggs and then apply the above varnish.

Stencil Ink.

INK BASE.

Shellac	4	oz.
Borax	3	"
Water	20	"

Boil together until 20 oz. of solution is obtained. Then incorporate any of the colourings.

BLACK.

Drop black	2	oz.
Powdered acacia	2	"

Mix thoroughly and then incorporate gradually with the base as stated above.

RED.

Venetian red	2	oz.
Powdered acacia	2	"
Mix with the base.		

BLUE.

Prussian blue	2	oz.
China clay	1	"
Powdered acacia	1	"
Mix with the base as above.		

India's Industrial Progress.

Burma's Mineral Production in 1934.

The report of mineral production in Burma for 1934 just issued states that the production of ore by the Burma Corporation, Ltd., from the Bawdwin Mines shows a decrease of 11,302 tons as compared with the previous year.

The Corporation's smelting and refinery operations resulted in the production of 70,560 tons lead, 1,255 tons antimonial lead, 68,838 tons, zinc concentrates, 11,000 tons copper matter, 3,951 tons nickel speiss, 5,792,019 tons troy ounces refined silver and 744 ounces gold.

The amount collected as revenue from minerals was Rs. 41,65,716 against Rs. 39,22,826 during the previous year, an increase of Rs. 2,42,890.

The total value of all minerals exported was Rs. 1,26,42,094, of which Rs. 14,97,50,188 were exported to India and the remainder to foreign countries.

Minerals worth Rs. 77,16,222 were imported into Burma. Of this Rs. 39,81,814 worth was imported from India and the balance from abroad in the previous year.

The total exports were Rs. 18,96,79,877 and the total imports Rs. 65,23,273 showing in both a definite increase.

The principal minerals exported to India were bar silver, pig lead, tin blocks and mineral oils of all kinds, and the principal imports from India were coal and mineral oils of various kinds.

VOL. XXVI. No. 308.

First Bengali Lino-type.

The inauguration of the operation of the first Bengali Lino-type by Mr. Shama Prasad Mookerjee, Vice-Chancellor of Calcutta University marked an important state in the development of the Bengali printing industry.

A company of Bengali scholars and representatives of Calcutta newspapers attended the function which took place in the showroom of the Linotype Company in Bowbazar Street, Calcutta.

One of the greatest difficulties in adopting Bengali to the linotype machine is the large number of Bengali characters. The linotype board can accommodate only 90 characters and with the help of the side magazine another 34, while Bengali demands about 600. This difficulty has been overcome by simplifying the characters, thus reducing the number to the range of the linotype keyboard. The machine looks exactly like an English linotype.

The work, said the Vice-Chancellor, was of national and even of international importance, for this would make it possible for foreigners to learn the great language which was the pride of every son of Bengal. One great handicap for the foreigner had been the difficulty of the Bengali script and one of the obstacles in the direction was now going to be removed.

Their thanks were due to those whose combined efforts had resulted in

this achievement, and particularly to Mr. S. C. Majumdar who first conceived the idea. It now remained for other people to take advantage of what had been done.

Improving Bengal's Cattle.

A scheme has been drawn up for the improvement of cattle in the province and funds are being provided out of the Government of India rural reconstruction grant.

It is understood that the Government have sanctioned a sum of money for the appointment of three additional livestock experts. The province will thus have the services of five officers, one each for the districts of Malda-Rajshahi, Hooghly-Bankura, Nadia-Murshidabad, Noakhali-Tipperah and Dacca-Faridpur.

It is estimated that if 100 pure-bred stud bulls are provided in each of the districts, the whole of the male stock there can be replaced by half-bred stud bulls in about eight years time. Ten districts in the province will then be completely stocked with half-bred bulls and the whole stock in the districts will eventually be half-bred. In about ten years time there will be no need for the importation of bullocks from outside the province a provision which at present costs Bengal Rs. 50,00,000 a year.

The commercial value of the stock in these districts, taking milk at eight seers to the rupee and the increased yield of the improved stock to be one seer a day, both very conservative estimates, works out in round figures at about Rs. 11,84,00,000. Against this the cost of providing 1,000 bulls will amount to Rs. 1,50,000.

Gin from Coconuts in Ceylon.

"Have a coconut gin" may become the most popular cry at cocktail parties in Ceylon, where efforts are being made to produce Ceylon-made gin, brandy and other liquors from coconut milk.

The process of manufacture is a secret but an English company who made experiments with it has pronounced it a success. The new process will give a fillip to the island's coconut industry which has suffered by the recent fall in prices, and the company is approaching the Government in order to obtain a reduction in the excise duty on liquors produced in this way.

It is hoped that, in time, Ceylon-made gin and brandy will entirely take the place of imported drinks.

Sugar From Toddy.

The Andhra Toddy Tappers' Conference at Bhimavaram has appointed a committee to investigate the possibility of manufacturing sugar from toddy on a commercial scale.

Mr. Vasudev Rao, a sugar expert of Masulipatam, explained to the Conference a process of manufacturing sugar from toddy by which the earning capacity of the toddy drawers can be increased.

Hydro-Electrics Merger Scheme

At the recent annual general meeting of the Tata Hydro-Electric concerns, the Chairman, Sir Nowroji Saklatvala, announced that a merger scheme embracing the three companies under the managing agency of Tatas, viz. the Tata Hydro-Electric Power Supply Company, the Andhra Valley Power Supply Company and the Tata Power Company, was under consideration. Sir Nowroji hoped that, though there were many difficulties in the way, the directors would be able to overcome them and to bring about amalgamation at an early date. Such an amalgamation scheme would appear most desirable. The three concerns are closely allied to one another; they are all housed in the same building, and, though their accounts are kept separate, their administrative staff is stated to be common.

But there appear to be some practical difficulties in the way of an immediate amalgamation of their share capital. For one thing, the cost of such an amalgamation is bound to be high, including stamp duties, registration fees, etc., incidental to bringing into existence such a unified organisation, and as this may amount to about Rs. 25 lakhs, the companies may not be willing to shoulder so heavy a burden at the present time. It is stated that conditions for such an amalgamation may be more propitious in 1941, when the existing debentures of the concerns mature.

Marble Deposits in North India.

The marble deposits in the Mullaighuri country at Shahid Mena in Lower Tirah are being excavated. Samples of marble sent to the Geological Survey have been reported upon as equal in quality to the best Italian marble. Already orders for marble to the value of Rs. 30,000 have been booked and 100 tribesmen are being taught quarrying under the direction of a trained quarryman. The marble will be sawn and polished at a factory which is being erected near Peshawar City railway station.

The manufacture of ornamental plates, bowls etc., is also to be undertaken and two skilled workmen are now teaching Afridi boys the art of cutting marble at the school at Lower Mena.

Col. E. W. C. Noel, Director of Agriculture and Allied Subjects N. W. F. Province, anticipates that it will be possible to sell marble valued at over Rs. 1 lakh per year. The marble will be sold at competitive rates as soon as the Afridi tribesmen have learnt the art of quarrying, etc. and should bring substantial profit to the tribesmen.

Waste Silk Factory.

The starting of the Waste Silk Spinning and Weaving Factory at Chennapatna—36 miles from Bangalore—is now imminent. The Government forwarded 300 lbs. of Mysore waste silk to England recently with a view to testing the capacity and efficiency of the waste silk weaving plant in England for which quotations

had been received. It is expected that the material spun from this waste will be received within about a week.

After an examination of this product the final decision as to whether the Government should decide upon purchasing English or Japanese plant for the proposed factory will be taken. If the material, when received fully justifies the claims made by the manufacturers in England on behalf of their plant—proving a high yield for a given quantity of raw material as claimed—it will automatically be decided to buy British machinery.

Glass Industry.

The resolution urging the need of giving effect to the Tariff Board's recommendations in favour of protection to the glass industry was negatived in the Council of State.

In winding up the debate on the resolution on the glass industry, the Commerce Secretary repudiated the suggestion that the Government of India afforded differential treatment between major industries like steel and textiles and a minor industry like glass. Government, he contended, is not bound to accept the recommendations of a purely investigating and advisory body. Soda ash is a very important material in the manufacture of glass and the anticipation that alkaline works would produce an adequate quantity of it has not yet been realised. Thus in the absence of an adequate supply of soda ash India is dependent on imports from abroad and Government has, by altering the duty on the same, helped the industry to reduce the cost of production by nearly 5 per cent.

Photographic Plates.

In the University College of Science under the guidance of Prof. H. K. C. the problem of the manufacture of photographic plates and paper has been satisfactorily tackled. It is understood that a company has been registered in Calcutta for the commercial production of plates, papers and photo chemicals.

Scientific & Technical Topics.

Cosmic Rays and Life.

The late Professor Joly of Dublin was the first to suggest that the cosmic rays may have an effect on life and may even be responsible for cancer. Professor Muller who turned the X-rays on fruit flies and thus speeded up evolution by about 1,500 per cent., has expressed the view that the rays may be only one of half a dozen mysterious forces which have played their part in moulding life.

Cosmic rays, which are much like X-rays and the gamma rays given off radium, but far more intense, cannot be made in the laboratory. How, then, is it possible to put the views of Joly, Muller and others to test? Near Oslo, Norway, is a silver mine, a thousand feet deep. Cosmic rays can pierce several hundred feet of ground and lake water, but no one has yet detected them at the bottom of a mine a thousand feet deep. So into the Norwegian mine mice were transported. There they stayed all their lives. So did their off-spring—four generations of them. Never were they struck by cosmic rays. Nothing happened of any importance. Compared with controls at the surface the mice born deep in the earth were a little heavier, a circumstance which probably had nothing to do with the cosmic rays.

Invention of High-speed Jute Weaving Machine.

According to THE FINANCIAL TIMES, a new high-speed jute weaving machine has been invented and is expected shortly to be installed in a Dundee factory.

If the machine proves to be a success, the opinion is expressed that the

whole of the jute manufacturing trade will have to be reorganized.

Only six weavers are required to operate ten of the new superseded looms, which have a capacity up to 220 picks as compared with the usual 130.

Cheap Radium Discovery.

It is claimed by an American Scientist, Professor Ernest Lawrence, of the University of California, that it would soon be possible to produce cheap artificial radium.

In his laboratory Professor Lawrence is producing minute quantities of radio sodium from a common salt.

He said that artificial radium should be produced shortly for commercial use from salt and other cheap substances, such as phosphorous. He could not estimate the cost of the new substance as a commercial proposition, but it would be much less than natural radium.

Some of his medical colleagues consider it possible that the discovery of artificial radio activity will ultimately be of greater importance to medicine than the discovery of natural radio activity.

New Staple Fibre Process.

A new process for the production of hollow filament staple fibre, which is formed in the coagulating bath in the actual length required, and is not cut as in other types of staple fibre, has been evolved by a Lancashire chemist, Mr. Fred Ferrand, after years of research.

The process has been tried out under mill conditions at the Lostock Hall Spinning Company, Ltd., near Preston, where Mr. Ferrand's plant has been erected.

The process consists briefly in passing a continuous flow of viscose and an intercepted flow of air through a jet. When coagulation takes place the interception of the air, which causes the filaments to be hollow, seals the ends of the interception of the air regulates the length of the staple.

The groups of filaments thus formed are gathered together on a bowl or dome within the coagulating bath which is so constructed that they are formed in substantially parallel formation into a mass or hank, which can be readily treated with the usual washing and bleaching liquors. The fibre is then fed by means of a hopper on to the cotton card and spun in the ordinary way.

Samples of fibres made by this process and of yarn and cloth made from them are available. It is claimed that viscose, acetate, and cuprammonium can all be spun into fibres by this process.

Mr. Ferrand is planning to form a new company to supply plant for the production of the fibre to spinning firms interested in the production of this raw material.

Colour Films.

When cinemas throughout the world are flooded with colour films, the film industry in Britain will not be found napping. British International Pictures are using colour sequences in their film, "Radio Parade for 1935," and Alexander Korda, producer of London Films, plans to produce a full length colour picture, in all probability "Lawrence of Arabia," next April. These events follow largely on the success of "La Cacaracha," a short experimental Technicolour picture, shown in America recently, and a British process, known as Hillman Colourgraveure, which promises to be superior to Hollywood's adopted system of Technicolour. It photographs with greater clarity and distinction, and entails, at the same time, but little extra cost over ordinary black-and-white photography. Other systems necessitate at least a 300 per cent. increase in studio lighting.

Waxing Keeps Melons Fresh.

Cantaloupe picked dead ripe may be received by consumers thousands of miles away in the same condition they came from the vines by the introduction of a waxing process developed by a California company. Coated with a thin layer of wax, the fully matured fruit by proper refrigeration can be kept edible for five weeks.

Highways Paved with Salt.

Rock salt is proving an efficient and economical paving material on farm-to-market roads where traffic is light. An eighteen-foot salt highway can be built for about 450 a mile. In road construction, rock salt can be mixed with clay or other material and rolled to a firm surface, or it can be placed alternately in layers. The salt soon permeates the entire mass by capillary attraction. It compacts the clay into a concrete-like consistency and crystallizes the road surface, making it shed water during a rain, so that it does not become slippery or muddy. About twelve tons of salt are used to the mile.

Exhaust Gas Peril Removed by Monoxide Eliminator.

Carbon monoxide, the deadly gas from automobile exhausts, can be removed from the air by an eliminator developed by two Colorado inventors who sought a way of lessening the danger to mechanics working in gas-filled garages. Starting with a unit thirty inches high and fifteen inches in diameter, they plan to build a compact eliminator for permanent installation on moving vehicles, to help rid city streets of the fumes. A rubber tube connects exhaust gases to the eliminator, fresh air being added through small holes in the pipe just before it enters the unit. The hot exhaust fumes are exposed in the eliminator to hot, electrically energized platinized wire coils which destroy carbon monoxide by replenishing the oxygen. Tested for months in a garage, the instrument kept the air constantly free from gases. It is expected to make possible the use of gasoline combustion engines in mines.

Formulas, Processes & Answers.

Sulphonated Olive Oil.

1686 H. A., Shikarpur—Desires to know the process of preparing sulphonated oils.

Take 100 lbs. of olive oil in a suitable wooden vessel and allow the temperature of the oil to come down somewhere about 10°C. Then weigh into a stoneware jug 6½ lbs. of pure sulphuric acid and cautiously run into the oil, the latter being constantly stirred to prevent over heating and decomposition. This addition is the most important part of the process and that upon which success in making a good oil depends. It must be made slowly and in small quantities at a time, so that it may take several hours to make the total addition. During this operation, the temperature of the reacting mixture must not be allowed to go above 16°C., otherwise a dark oil will be formed containing decomposition products. When all the oil has been added, the mixture is allowed to stand covered up for about a day, when it is ready for washing.

This is best done with a strong solution of common salt, which is made up in a separate vessel.

The salt solution is added to the oil and the whole well stirred together when the mixture is allowed to stand for separation. The oil comes to the top of the liquor and the salt solution can be separated off by means of a syphon, or if convenient this washing should be done in a wooden vessel, having fixed at the

bottom a draw-off cock for separating the washing of salt solution. This washing operation is repeated several times, when finally the oil is allowed to further stand, so that as much water as possible will settle out. The final process is neutralising, for which can be used a caustic soda solution or diluted ammonia. Caustic soda solution is added in small amounts at a time, stirring after each addition, until the oil reacts neutral to litmus paper, that is, it changes neither the colour of a red or blue paper. The resultant oil is then ready for use. The actual end point of the neutralising can easily be judged after a few trials, as the oil suddenly goes quite clear.

Bookbinders' Cloth.

1775 S. K., Lahore—Wishes to learn the process of manufacturing bookbinders' cloth.

Book binder's cloth may be manufactured by coating thinly and evenly on one side of cotton cloth with an enamelled paint and then by embossing it so as to imitate leather or morocco.

Enamel Paint.

The enamelled paints can be made by mixing varnish and pigments. The oil varnish is heated and reduced about 25 to 35 per cent. by the evaporation of spirit, and the colours are added while the varnish is hot. For a white paint either white lead, zinc white, or barium sulphate is used with larger quantities of

turpentine and some china clay if a matt surface is required. Driers are also added, manganese borate being a favourite substance. The following formula is generally recommended.—

Zinc white	15 lbs
White lead	8 lbs.
Oil varnish	1½ gallons
Oil of turpentine	1½ gallons.
Rosin	3 lbs.
Blue	a trace.
Manganese borate or calcined zinc sul- phate	4 to 10 oz.

An improved process for making book covers is given below:—

In this method book covers are made in endless strips by using a composition of oils solidified by mixture with fibrous substances and colouring matter and pressed through embossed rollers, which produces a resemblance of morocco, but with sharper outlines capable of being washed. The mixture principally used consists of 100 parts of oxidised oil, 10 of rosin, 10 of copal, 20 of white lead, 10 of colouring matter, 20 of sawdust, and 10 of paraffin wax. These substances are intimately mixed in a horizontal cylinder heated by steam. The cylinder is provided with a shaft with inclined wings by which the contents are carried forward and pressed out through an aperture in similar manner as the clay in a kneading machine. When the mixture is ready it is spread upon a basis of textile fabrics but principally consisting of paper combined with a fabric. A suitable agglutinant consists of, 12 parts of oxidised oil, 1 of copal, 1 of rosin, 24 of ochre, and 2½ of turpentine. Oxidised oil is prepared by applying a drying oil to a

tissue and exposing it to the action of the air, and when dry spreading on repeated coatings until the enamel thus formed is about ¼ inch thick. The solid oil is then ground together with the tissue upon which it has been formed

Tin Printing.

1824 G. H. H., Virarajendrapet—
Wishes to learn the process of printing tin.

The modern method of printing upon tinned plates is an application of offset printing. The printing machines may belong to either the flat-bed or the rotary type, but they are built for this special purpose and have their own characteristics. The tinned plate, does not actually come in contact with the printing surface; but as it is carried round with the cylinder into which it is fed, it receives an offset impression from a rubber blanket fixed upon a second cylinder, which has already taken a direct print from the printing surface. As the plates are printed they are arranged in racks and kept aside to dry or they may be put into a stone for forced drying.

Before printing, each plate should be thoroughly rubbed on both sides with a duster to remove dirt, grease, etc., which may perchance have got upon it, and which, if left, would prevent the ink from printing. Rough edges must also be smoothed, as otherwise the rubber blanket would soon be damaged.

The method usually adopted is the same as that of printing paper. The white would be done first, and we cover up all parts except those require

to appear as gold and silver, or any parts in which a colour is required to appear with a lustre. Of course, only transparent yellow lacquer is usually printed after the white; it produces a nice strong buff where it falls upon the white, and a bright gold where it comes upon the bare tin. It may, however, be had of various shades to suit special requirements. It helps to give depth of colour and brilliancy to solid reds and other colours. It is an important matter for the artist when drawing the design to take full advantage of the light colours. The black printing would come next, followed by the red and the blue. After the work has dried, the plates are varnished and then stoved, after which they are ready for the tin box workers.

As with ordinary offset printing, the rubber blanket will require to be washed several times during the day. This should be done with a very volatile liquid such as solvent naphtha spirits of turpentine, or benzoline, and it should be immediately afterwards dusted over with fine flour sulphur. This treatment will impart to the rubber a fine printing surface.

All designs to be printed on tin should be specially lithographed by an artist with experience of tin plate work. Type matter must be reversed.

Extraction of Rosin.

1882 H. C., Hoshiarpur—Wants to know a process of extracting rosin.

There are various methods of distilling turpentine oil both from the resinous wood and from the oleo-resins; but the following method is generally adopted.

The oleo-resin as received from the forests is first melted by steam, a little turpentine obtained from previous operation added to enhance the process. On standing for a short time, the water, dirt and other impurities present sink to the bottom of the vessel and the clear oleo-resin which now stands in upper layer is syphoned into tanks from which from time to time a measured quantity is passed into the distilling vessel. The latter is provided with a steam jacket and kept hot by steam under pressure to maintain any desired temperature. Steam is also forced into the still and the turpentine oil together with water vapours which distil over is first passed through an empty vessel and then into a condenser. The object of putting the empty vessel into the intermediate position is to catch any oleo-resin or resin that may have come during the process. The liquid turpentine and water which collect in the receiving vessel at the further end of the condenser are now separated from each other by means of a mechanical separator. The oil thus obtained contains much impurities and is below the standard qualities that can be procurable in the market. To remove these impurities the crude oil is redistilled in another vessel and passed through lime water. The purified oil still contains traces of water which are now-a-days removed by storing the oil for a time in bulk.

The residue left in the vessel after distillation is the rosin of commerce. This is taken out while still hot by means of a valve and transferred to the rosin shed, where it is filtered through a layer of cotton wool and then run into casks.

Waterproofing Cloth.

1822 V. & C. Murree Hills—Wants a process of preparing waterproofing cloth.

To render the cloth waterproof take 2½ lbs of alum and dissolve this in 10 gallons of boiling water; then in a separate vessel dissolve the same quantity of sugar of lead in 10 gallons of water, and mix the two solutions. The cloth is now well handled in this liquid, until every part of it is penetrated; then it is squeezed and dried in the air, then washed in cold water and dried again, when it is fit for use. If necessary the cloth may be dipped in the liquid and dried twice before being washed. The liquor appears curdled, when the alum and lead solutions are mixed together. This is the result of double decomposition, the sulphate of lead, which is an insoluble salt being formed. The sulphate of lead is taken up in the pores of the cloth, and it is unaffected by rains or moisture, and yet it does not render the cloth air tight

Hand-made Paper.

1883 A. I. S. Á., Madhubani—Desires to know the process of making hand-made paper.

Steep about 10 seers of old rags in a reservoir in which a small quantity of lime has been added. After a day or two take out the mass and squeeze out the water from it as far as possible. The whole mass is then subjected to the process of pounding. The operation is carried on with the help of an indigenous tread-mill. This is the most laborious part of the business, and takes about 8 to 10 hours to complete. The mass is then kneaded until the whole is turned into a soft consistency. After this the mass is

again soaked in diluted lime solution in which some saji-mati (alkali) has been added for about 2 days, then washed in a stream of water holding it in a canvas screen. The washing is continued until the washed water is clean.

The pulp thus prepared is now mixed thoroughly with a large quantity of water contained in a large earthen tumbler. Now a fine sieve fitted in a wooden frame is dipped into this solution, in which the pulp is now suspended in a state of fine division and is carefully taken away leaving the newly formed sheet of paper.

The sheet is now carefully detached and exposed to the sun to dry. When dried, it is trimmed and then sized with a thin layer of starch solution. This is then thoroughly dried. The paper is now stretched on a wooden board and rubbed with a cylindrical piece of stone, and is then ready for the market.

Graphite Crucible.

1847 R. A. W., Rajahmundry—Wishes to learn the process of making graphite crucibles.

Crucibles for various metallurgical purposes are generally made on an ordinary potter's wheel. But often special machines are also employed for the same purpose and for a large scale manufacture. One of these is known as Morgan's machine for making either large or small crucibles. The peculiar mechanical arrangement consists in fitting the former, or forming tool employed in the apparatus, so that in addition to being capable of an up-and-down movement, the former is free to be moved and adjusted horizontally as the crucible

being moulded, and according to the required size or thickness of the crucible.

When a crucible is to be made the frame is pulled down to cause the former to enter the plastic material, which is placed in a mould, on a revolving lathe or jigger, as usual, and when the former reaches the bottom of its course, a catch on one of the uprights secures the frame in position. The threaded rod is then turned, to cause the former to move horizontally, and spread the plastic material against the side of the mould. Finally, the back end of a lever carried on the top of the frame, and free to move backward by means of slot or otherwise, is inserted into a hole formed for the purpose, and its forward end is pressed down by hand, so that the lever bears forcibly upon the frame, and prevents all vibration or movement of the former. When the crucible is finished, the handle is turned to bring the former to the centre of the crucible, the lever is moved forward out of its hole, the catch released, and the frame raised up by a balance-weight. The operation is then repeated for the next crucible, and so on.

Shaving Soap.

1868 S. F., Ajmer—Desires to know a formula for the preparation of shaving soap.

Tallow	250	parts.
Coconut oil	125	"
Lard	25	"
Caustic soda lye of 30°Be	275	"
Caustic potash lye of 20°Be	75	"
Oil of lavender	1	part.

Oil of thyme	$\frac{1}{2}$ part.
Oil of cumin	$\frac{1}{2}$ part.

Melt together tallow, coconut oil and lard and allow the mixture to cool off to 115°F. Then add the caustic soda lye and caustic potash lye with gentle stirring and perfume the soap with the oils stated above. Set aside for a day and then cast into sticks by means of moulds.

Tomato Catchup.

1933 P. N. S., Allahabad—Wishes to have processes for preparing tomato catchup and chutney.

Ripe tomato	3 dozen.
Vinegar	1 pint.
Garlic	1 oz.
Shallots	1 oz.
Common salt	1 oz.
Cayenne pepper	$\frac{1}{2}$ dr.
Lemon juice	5 oz.

Put the tomatoes into a jar, and warm in an oven until tender, cool, remove the skin and pulp of the fruits, and add to the liquor in the jar, along with the rest of the solid ingredients. Mix well and bottle.

Tomato Chutney.

Take one seer of ripe tomato and add an equal amount of sugar and about $\frac{3}{4}$ seer of water. Boil down to a heavy pressure and put in jars while still hot. If desired spices may be used before the tomatoes are boiled, which gives a good flavour.

Fluid Extract of Sarsaparilla.

1948 S. H. K., Ahmedabad—Wants processes of preparing fluid extract of sarsaparilla, inks, etc.

Sarsaparilla, in coarse powder	750 grms.
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Glycerrhiza, in coarse powder	120	"
Sassafras, in moderately coarse powder	100	"
Mezerenum in moderately coarse powder	30	"

Mix the powders and then moisten the mixture with a sufficient quantity of menstruum:—

Glycerine	100 c. c.
Alcohol	500 c. c.
Water	400 c. c.

To render it evenly and distinctly damp and to maintain it so after standing for 6 hours in a tightly covered container, pack it in a cylindrical percolator, add the remainder of the menstruum and when this has just disappeared from the surface, gradually add diluted alcohol, until the drug is practically exhausted. Reserve first 850 c.c. of the percolate; recover the alcohol from the remainder and concentrate the residue to a soft extract at a temperature not exceeding 60°C; dissolve this in the reserved portion, mix thoroughly, and finally add a sufficient quantity of diluted alcohol to obtain 1000 c.c.

Average dose: 30 minims.

Blue Ink.

Resorcin Blue	48 grains.
Sugar	192 "
Oxalic acid	10 "
Distilled water	19½ fl. oz.

Mix the dye with 1 fl. oz. of cold water, set aside for two hours, then add the remainder of the water, in hot state, and the other ingredients and stir until dissolved. Any other water soluble blue may be used such as phenol blue, methylene blue, etc.

Blue-Black Ink.

Gallic acid	60 grains
Ferrous sulphate	100 "
Dilute sulphuric acid	4 fl. drams.
Powdered gum acacia	200 grains.
Liquid phenol	30 mins.
Glycerine	140 "
Phenol blue	16 grains.
Distilled water, sufficient to produce	20 fl. oz.

Dissolve the ferrous sulphate, gum acacia, liquid phenol, glycerine and sulphuric acid in 8 oz. of distilled water, with the aid of gentle heat; continue the heating until the liquid just begins to boil, and add to it gradually the solution containing the ferrous sulphate, etc., shaking after each addition. Make up to the required volume (20 fl. oz.) with distilled water, filter, and add the phenol blue, shaking until dissolved.

For fountain pens the gallic acid may be increased to 80 grains, the ferrous sulphate to 120 grains, add the phenol blue to 20 grains and the gum acacia reduced to 160 grains. The volumes of ink should be increased to 40 fl. oz. by addition of water.

Green Ink.

Green ink may be prepared by dissolving aniline dyestuff such as Neptune Green S. G.; Diamond G. B., Light green S. F. in 80 times its weight of water.

Eucalyptus Tooth Paste.

Precipitated chalk	3 oz.
Talc	2 oz.
Powdered soap	1½ oz.
Arrowroot	1½ oz.
Solution of carmine	1½ dr.
Oil of eucalyptus	½ "

Oil of peppermint	15 mins.
Oil of rose geranium	15 "
Oil of clove	5 "
Oil of anisi	5 "
Glycerine	1½ oz.
Chloroform water	q. s.
Mix into paste of desired consistency.	

Imitation Gold.

1949 S. N. S. K., Gulbarga—Wishes to have formula for making imitation gold and amalgam.

To 5 lbs. 10 oz. of melted copper are successively added 3 oz. fuller's earth, 7 oz. borax, 3 oz. ammoniated mercury, 12 oz. of tin, 3 oz. magnesium oxide and 1 oz. alcohol, and the mixture is agitated and boiled. The resultant alloy stimulates gold and is malleable, ductile, immune from tarnishing and suited for jewellery.

Mercury Amalgam.

Mercury unites with many of the metals upon mere contact. Generally speaking, little heat is given out in the formation of amalgams, excepting in the case of those of the alkali metals, when the reaction is a decidedly violent one, with the evolution of much heat and light in the case of alloys of tin, lead, and bismuth, heat is absorbed. Further, with a few exception (of which the alloys of silver and copper are the chief), little or no contraction in volume occurs. Most amalgams may be prepared by agitating or rubbing together the mercury and the other metal or metals, the latter being in a finely divided state, and heat being applied if necessary, or, in the case of the easily fusible metals, by adding the mercury to them in the molten state, care

being always taken that the temperature shall not rise so high as to volatilise the mercury.

Dried Ginger.

1966 U. K. B., Udipi—Wants to know a process of preparing dried ginger.

The best dried ginger is prepared from well developed, properly matured rhizomes. The ginger is sun dried and the adhering earth is removed as much as possible. The first operation is preparing dried rhizomes in water. This with rubbing cleans the rhizomes, and also softens them. The soaking facilitates the removal of the outer skin. It is scraped off with a shell or broken pieces of earthenware. The scraped ginger is now washed and exposed for three or four days to the sun. The ginger is thus bleached and dried. It is now rubbed by hand. The operation is done carefully, so that the shoots are not broken. The ginger is again bleached in the sun followed by rubbing as indicated above. After this the ginger is steeped in water for about two or three hours and exposed to the sun to dry. When dry it is rubbed on a coarse cloth, which removes the remaining outer skin not removed by previous operations. The dried ginger is now ready for the market.

Liquid Blacking.

1992 S. Y., Bombay—Wants to know a good recipe for preparing liquid blacking.

Ivory black	12 oz.
Treacle	4 "
Sperm oil	1 "

Vinegar 40 oz
Sulphuric acid (by weight) 2 oz.
Mix.

Sulphur Lotion.

2008 H. R., Hyderabad—Wants to know a process of preparing sulphur lotion.

Zinc oxide 1 ounce.
Precipitated sulphur 4 drams.
Glycerine 1 ounce.
Rose water to make 20 ounces.

Mix the zinc oxide and precipitated sulphur with the glycerine in a mortar, and to this add the rose water. Transfer to a bottle, and wash out the mortar with the water.

The lotion may be coloured with a grains of carmine triturated along with the zinc oxide.

Gold Paint.

2043 K. L. M., Bhagalpur—Desires to know processes for preparing Gold paint dental impression wax, etc.

This consists essentially of bronze powder mixed with a varnish as the suspending medium. Care must be taken to ensure that the latter is free from acidity, otherwise it will develop a greenish colour.

Celluloid, in shreds 1 oz.
Amyl acetate 20 oz.
Dissolve and mix with
Bronze powder 1 oz.

Dental Impression Wax.

Among the preparations used by dentists for taking impressions are bees-wax, guttapercha, and plaster of paris. A reliable formula for such composition is as follows:—

Stearin 8 oz.
Dammar 12 "
French chalk 2 "
Carmine to colour.

Melt the stearin and shake into the dammar, previously powdered, then add the chalk tin and with the carmine and geranium oil 30 drops.

Water Repellent Composition for Motor Car Hoods.

To render the fabric water-repellent it is usually treated with a fat dissolved

in a volatile solvent, e.g., wool fat in benzin. The following is a suitable formula:—

Cellulose acetate	13 parts.
Tetrachlorethane	88 "
Carbon tetrachloride	24 "
Acetone	48 "
Alcohol	40 "

Washable Distemper.

Paris white	560 parts.
Zinc white	160 "
Plaster of paris	160 "
White dextrin	39 "
Acacia	16 "
Borax	9½ "
Alum	9½ "

One pound of this is to be mixed with a pint of boiling water, the mixture is well stirred, and then thinned with cold water.

Etching Cream.

Etching cream used for marking glass consists of equal parts of ammonium fluoride and barium sulphate made into a cream with hydrofluoric acid. This is applied to the glass by means of a rubber stamp, allowed to remain for 12 hours, then washed off.

Tailor's Chalk.

Ordinary pipe clay is softened in water, working in ultramarine for blue, finely pulverised ochre for yellow, burnt ochre for red, etc. until the mass is very evenly mixed. From this, slabs for the desired size are formed which, approximately trimmed, are pressed into the oiled wooden or metal moulds. After moulding, the pieces can be dried in the air, or in a moderately heated place, after which they are ready for use.

Salol.

2045 R. F., Partabgarh—Wants to know the method of preparing salol.

Salol or phenyl salicylate, the ester derived from phenol and salicylic acid, is prepared by the action of an acid chlorin such as phosphorous oxychloride or carbonyl chloride upon a mixture of salicylic acid and phenol or by heating the acid itself at 220°C.

READER'S BUSINESS PROBLEMS

[Reader's business problems will be discussed in these pages. We invite the reader to write us his difficulties. As the department is in charge of an experienced businessman who is specially adept in dealing with such problems and to whom experiences of a large number of successful business men are available, his replies will lead the enquirer to a successful career. These replies will be published in the paper only and cannot be communicated by post.]

Cultivation of Pomegranate.

2152 P. K. D., Patna—Wants to be enlightened on the cultivation of pomegranate.

Pomegranate plant should be set in a sunny place. Soil should not be predominating sand and should contain sufficient amount of moisture. It should by no means be planted in a water logged place.

Pomegranate can best be propagated by cutting or grafting. If the plant is to be reared from seed, selection should be made from fresh seeds of ripe fruits. The seed should not be allowed to get dried before being sown. Preferably seed may be put with seedbed or in an earthen pot.

In setting pomegranate plants one need not dig big pits. Dig a pit two cubits deep and 1 cubit in diameter and fill it with cowdung, rubbish, burnt earth, lime and bone dusts. Plantation can be made from July to February. Before putting the plant, a portion of the root is cut off with care. At the foot of the plant place rubbish and burnt earth.

After planting moisten the base of the plant with water from time to time. In winter earth round the plant is dug up upto 1 cubic deep so that sunshine and air may play on the exposed roots. Allow the exposure to light and air for a fortnight. Then fill up the pit with manured earth.

When fruits are ripe, the portion of branches which bore the fruit is to be cut off. Usually December and January are the best time for pruning.

Methods of Exporting Goods.

2164 N. L. K., Bombay—Requests us to describe the methods of exporting goods.

When an order is received for sending goods to a foreign country, it is

ordinarily known as an indent and it contains particular about the order and the terms and conditions for its execution. Amongst others it usually contains the following particulars:—detailed description of the goods required, the rate of price, shipping and packing instruction rate of valuation for insurance purposes, the date of shipment, and the terms of commission, etc. Thereafter the exporter places order with manufacturers, wholesale dealers or producers, etc; whom he considers able to supply one or more items of goods mentioned in the indent, or ask for quotation from them. Then he sends intimation to the foreign merchant confirming the order given in the indent. Then instructions for packing, forwarding will be given to the suppliers. These contain directions regarding the marks and numbers to be put on the cases and the name of the port, dock or station where they are to be sent mentioning the ship by which they are to be shipped, and their ultimate destination. In packing and marking particular care should be taken according to the nature of the contents. When the goods are loaded invoices are prepared giving the name of the vessel and the marks and numbers of the cases together with the charges for cases; cartage, freight, prime, bill of lading, dock charges and insurance charges. When the goods are placed on board the ship, the bills of lading in triplicate are prepared and signed by the master of the ship. They are also to be stamped. Thereafter they are handed over to the shipper of the goods. Each of them contains the names of the ship, and the shipper, the place of loading and destination, the description of the goods together with their weight and freight charges, the name of the person to whom the goods are to be delivered. When the goods are actually loaded, the

shipper gets a mate's receipt for the goods thus loaded. The bills of lading are received by him from the office in exchange for the mate's receipt.

One invoice, one of the bills of lading together with the insurance policy covering the goods, if any, are sent by post to the consignee so that they may reach him before the arrival of goods. It is also customary to send duplicate copies of the same by the next mail again, to the consignee so that if the invoice, bills of lading, etc. sent previously be miscarried the consignee may be put to any difficulty. The triplicate copy of these documents are kept by the shipper with himself.

The consignee on receipt of all these documents compares the details contained in them with the details of the order placed by him in order to see that the order has been strictly complied with.

Prospects of Cotton in Foreign Countries.

2192 R. L. D., Amraoti—Wants to know the prospects of cotton in foreign countries.

From information specially obtained from the United States Department of Agriculture, Washington it appears that the area of cotton in cultivation in the United States of America during the current year is estimated at 29,166,000 acres and the production of the crop is at present estimated at 11,798,000 bales of 500 lbs. each (equivalent to 14,848,000 bales of 400 lbs. each) as compared with 9,636,000 bales of 500 lbs. each (equivalent to 12,045,000 bales of 400 lbs. each), the revised final estimate of 1934.

From the latest available bulletin published by International Institute of Agriculture, Rome, it appears that the production of cotton in Egypt for 1934-35 is finally estimated at 1,871,000 bales of 400 lbs. each showing a decrease of 12 p.c. as compared with the preceding season. In the Anglo-Egyptian Sudan the production of cotton for the year 1934-35 is now estimated at 271,000 bales of 400 lbs. each as compared with 161,000 bales in 1933-34. In Uganda the production of the crop for 1934-35 is now estimated at

246,000 bales of 400 lbs. each showing a decrease of 10 p.c. as compared with the preceding season. The final estimates of area and yield of cotton in China for 1934-35 are placed at 6,828,000 acres and 3,732,000 bales of 400 lbs. each showing an increase of 11 and about 15 per cent. respectively, as compared with the preceding season.

Openings for Educated Indian Ladies.

2216 L. M. C., Dacca—A girl of mine has passed the I.A. I am unable to provide for her further studies. The same reason operates strongly against her marriage as obviously I cannot give her away in marriage to one who is *below her from an educational viewpoint* and I have not the money necessary for her marriage with a bridegroom of high educational attainment. Though I am a Hindu, I do not observe the purdah. Can you tell me what arrangements I am to make for her future career.

This is a very complex question, the solution whereof involves issues of social and economic nature. At any rate we are glad that you have told us that although a Hindu you do not observe the purdah. This has made matters somewhat easy for us. It would no doubt have been eminently desirable if you could have managed to get her graduated. Now why not ask your daughter to join one of the insurance companies as a canvassers. The prospects are ample, and a smart and educated lady, after some preliminary training as is usually imparted to their canvassers at least by some of the insurance companies is sure to make a good income by her activities. Competition is unknown, the number of ladies who have hitherto joined this line, is exceedingly limited. The work besides, is not likely to be very hard in nature. Anyway we feel sure that insurance companies will only be too glad to respond to your queries if you enquire of them on your daughter's behalf as to whether or not there is any prospect for her if she chooses to start as canvasser of insurance policies.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of Industry are invited. Enquiries or replies from our experts will be published free of charge. Questions are replied by post on receipt of As 4 stamps of small value only for each question. In order to facilitate the work of Editor's Department and to help prompt action the readers are requested to send enquiries in separate letters.]

2115 S. L. M. R., Singapore.—Button making machine may be supplied by Messrs Dickamp, Carl, Berlin; Messrs Schonbach, Adolf, Berlin, all of Germany.

2116 B. R. Alawalpur.—Refer your query to High Commissioner for India, India House, Aldwych, London W.

2117 T. V. R. T., Trichinopoly.—Wants to be put in touch with importers of shellac in Germany and other foreign countries.

2118 G. P. C., Safidin.—Wants to be put in touch with exporters of 'live stock' especially monkeys.

2119 G. D. C., Rawalpindi.—(1) Silicate of soda has no vernacular synonym. (2) Crackling sound is the sound which is produced when water is sprinkled over a highly heated oil. (3) Soap begins to thicken means the mixture of oil and lye begins to thicken on stirring. (4) Silicate of soda cannot be substituted by washing soda, salt or anything else. (5) By cold process you cannot get a soap in a few minutes. The mass may thicken by that time but saponification cannot be completed. You should read the book of Soap Manufacture thoroughly and carefully. (6) Hot process, I mean boiling process is better than cold process. (7) The test of a good washing soap is its cleansing and lathering power, good appearance, hardness and durability. (8) You will find lots of formula in that book of soap. You may also refer to Mr. R. Ghose, Soap Expert, 8, Kripanath Lane, Calcutta.

2121 P. I. & O. M. C., Aligarh.—The address of the inventor or dealer of "Good-Bye to Boiler Scale" is not known.

2122 O. P. M. Ajmer.—(1) Allopathy would probably be better than Homeopathy. (2) Dairy, gardening and agriculture are taught in Allahabad Agricultural Institute, Allahabad, U. P. and Chumsura Agricultural College Chumsura, Bengal. (3) Dentistry may be learnt from Calcutta Dental College & Hospital, 249, Bowbazar Street, Calcutta. Please write for prospectus to the institutes direct.

2124 G. R. S. Hyderabad.—Following is a good formula of Shellac Varnish:—Orange shellac 2½ lbs.; methylated spirit 1 gallon; benzoin ¼ lb. Put the shellac and benzoin in methylated spirit in a closed vessel. Keep aside for a few days or until dissolved when the finished varnish is ready for use.

2125 S. H. Bally.—The original method of preparing 'Chiki Supari' is that the mature nuts which are not dried are first shelled, then boiled and flattened by pressure while yet soft and then dried. Modern method is, after the nut is boiled the soft nut is dipped into a thin mucilage of gum Arabic suitably perfumed with essential oils and then pressed and dried. A little solution of catechu is sometimes mixed with the gum solution for colouring. The lustre of the Chiki is due to this gum coating. Moulds cannot grow on betelnut thus treated. Sliced nuts are also prepared in the same manner only difference being that these are not pressed.

2126 B. R. P. Lahore.—(1) Japanese piece-goods may be purchased from the following importers: Nippon Menkwa Kabushiki Kaisha, D-3, Clive Buildings, 8, Clive Street, Calcutta; Toyo Menka Kaisha Ltd. 5, Royal Exchange Place, Calcutta; Pannalal Sagar Mull 112, Cross Street, Calcutta; (2) Fancy goods may be

Machinery for the Manufacture of

Chemicals, Powder, Hair Oils, Creams, Perfumes, Pills, Tablets, Drugs, Medicines.
Artificial Ghee, etc. Also:—

Chemical Plant, Oil Mills, Filter Presses, Sugar Mills & Centrifugals, Tin Box Making Machinery, Sterilisers, Laboratory Apparatus, Biscuit and Bread Making Machinery, Laundry Machinery, Tube-filling Machinery, Winnowing Machinery, Threshing Machinery, Fruit Preserving Machinery, Water Softening Plant, Slate and Stone Working Machinery and Pumps for all purposes.

W. J. ALCOCK & CO., 7, Hastings Street, Calcutta. Saroup & Bansilal, 57, The Mall, Lahore. Agent for Bareilly District KODESIA ENGINEERING CO., Naini Tal Road, Bareilly.

supplied by Bombay Stationery Mart, Victoria Bldgs., Fort, Bombay; Hajee Jan Mohd. Latiff, 299, Abdul Rehman St., Bombay; Bengal Stores, Chowringhee Place, Calcutta; D. N. Bhattacharjee & Sons, 33, Canning Street, Calcutta.

2127 P. P. P. Mothari—(1) There is no institute training photography. Better be an apprentice to a photographer. Practical soap training is given in Soap Training House, Saidpur but we don't know anything about the merit of its training. Mr. R. Ghose, 8, Kripa-nath Lane, Calcutta, trains by post, which as far as we know, is satisfactory.

2128 K. M. S. G., Agartala—(1) Dyes for ink may be had of Fuzle Hossain & Co., 44, Armenian Street, Calcutta. (2) The formulas of vermilion will be found in Home Industries published from this Office.

2134 S. R. A. W., Rajahmundry—Barytes and graphites are of course useful commercial articles but it is not possible to work a mine with such a poor capital as Rs 500/- Better you should go to the place and realise the situation personally before embarking upon the business.

2135 S. M. A. S., Mysore—(1) Your query about "Desi Oils" is not understood. Please explain the term. If you want preparations of hair oils etc. you will find them in Indian Perfumes Essences & Hair Oils, price Rs. 1-8 only. (2) Formulas of pan patti masalas will be found in Prospective Industries price Rs 1-8 only—both published from this Office.

2136 S. C. M. C., Jullundur City—For expert opinion in cigarette manufacture you may refer to T. V. Lynn & Co., 58, Forbes Street, Fort, Bombay.

2138 S. B. Colombo—Glass melting pots and furnaces as referred to may be supplied by Burn & Co., 12, Mission Row, Calcutta.

2139 L. S. K., Bombay—Bichromated albumen may be prepared thus—Take white of an egg; distilled water 4 fl. oz.; potassium bichromate 1 dr. Dissolve the bichromate in the water, add it to the albumen and triturate in a mortar. Then strain through a piece of fine cloth.

2141 U. M. H., Bombay—Following are glazed tile and brick manufacturers of United Kingdom:—Brown Robert & Son Ltd., Fergu-

slie Works, Paisley; Scottish Enamelled Brick Co. Ltd., Glasgow; Stourbridge Glazed Brick & Fireclay Co. Ltd., Blowers Green, Dudley. Other addresses asked for are not available.

2144 E. E. C. Cocanada—(1) The name of the Japan Directory is The Osaka Trade Index to be had of The Osaka Commercial Museum, Osaka, Japan. For particulars write to them direct. (2) The manufacturer of eagle brand thermo-flask is Yamatomi & Co., 1-Chome, Utsubo, Shimodori, Nishiku, Osaka, Japan; Crown brand pens are manufactured by Sawai & Co. Ltd., Andojbhashidori 3-Chome, Minami-ku, Osaka, Japan. Their Indian agents are not known. Write to the parties direct.

2145 S. B. S., Ahmednagar—Wants to buy moulds in which metal gods and goddesses can be moulded.

2146 S. S. Gwalior—Ready made labels for hair oils etc. may be had of Shah & Co., 55, Ezra Street, Calcutta.

2149 S. K. M., Bombay—(1) Surcharge means extra charge. (2) Net value is the value deducting commission or discount. (3) Ask a lawyer. (4) Diploma is the document of the degree. B.A. is a degree and the certificate is the diploma. (5) Not known. (6) Excepted articles means the articles that are excluded and do not come under the category of general articles. (7) Through traffic means direct communication without stoppage. (8) See postal guide. (9) No. (10) In consignment booked to self only the consignor or his assignee can take delivery of the goods while consignment booked to consignee can be taken delivery of by the consignee or his assignee. (11) As you are in need of multifarious commercial intelligence you should better get yourself admitted into some commercial institute for thorough knowledge.

2150 J. N. R. Siliguri—(1) For pig breeding following books are recommended:—Profitable Pig Breeding and Feeding by Allen, price 5s. The A. B. C. of Profitable Pig Keeping by Butcher, price 1s. 6d. (2) For Poultry the following books may be read: Poultry-Keeping on the Farm by Brown, price 2s.; Town and Suburban Poultry by Elkington, price 1s. 6d.; Poultry Craft by Hooly, price 15s.; The Truth about Poultry by Scott, price 5s.; all to be had of Chucker-vertty, Chatterjee & Co. Ltd., 15, College Square.

— ESTABLISHED 1917 —

GANN BROTHERS, TOPALL WORKS, LUCKNOW.

THE ONLY SUPPLIERS IN INDIA OF

COMPOSITION CORKS FOR FOUNTAIN. PEN INK POTS. BOOT CREAM BOTTLES, MEDICINAL AND FOR HAIR OIL PHIALS. COMPOSITION POTS FOR OINTMENTS, POWDERS, POMADES, ROUGE, SINDUR, SNUFF, ETC.

Branches: 153/1, RADHABAZAR STREET, CALCUTTA. 3, CHUNAM LANE, BOMBAY, 7.



Calcutta. (3) Pitman's Shorthand would be helpful to press reporters (4) Cigar making has been fully dealt with in Indian Tobacco & Its Preparation, price Rs. 1-8 only, published from this Office. The principal ingredients of cigar is tobacco leaf which may be had of tobacco merchants such as Asharam Todarmall, Kaunia, Rangpur, D. N. Dass, Kayapati, Cooch Behar, Kyodo Tobacco Co. Ltd., Clive Buildings, Clive Street, Calcutta.

2156 R. K. K., Multan City—Process of joining broken gramophone records will appear in an early issue of Industry.

2159 J. B. S., Bellary—Process of making lime and mortar will appear in an early issue of Industry.

2160 H. D. D. S., Colombo—(1) You may consult The Exposition of Match Industry by P. C. Roy to be had of Bengal Trading Syndicate, 5 & 6, Hare Street, Calcutta. (2) As regards plantain fibre you may consult Plantain Fibre and Fruit Industry by J. K. Sarkar.

2161 B. B. L., Saharanpur—For small cane crushing machine write to Bantra Engineering Works, 223, Belilios Road, Bantra, Howrah, and Keshab Chandra Banerjee, 180, Belilios Road, Howrah.

2163 W. A., Bandra—For French chalk write to Calcutta Mineral Supply Co. Ltd, 31, Jackson Lane, Calcutta.

2167 V. C. G., Athini—(1) We are not aware of any book dealing with cigarette manufacture. (2) For the book required you may enquire of W. Newman & Co. Ltd., 4, Old Court House Street, Calcutta.

2169 B. N. D. S., Desur—An article on brick and tile manufacture will appear in an early issue of Industry. For clay cones write to Burn & Co, 12, Mission Row, Calcutta.

2171 N. R. Q., Coimbatore—Process of manufacturing bread and biscuit will appear in an early issue of Industry.

2172 P. P. A., Akyab—(1) Shellac may be had of Angelo Bros., Ltd., 6, Lyons Range, Calcutta and Kishun Prasad Bansidhar, 7, Mis-

sion Row, Calcutta. (2) Mercury may be had of B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta. (3) There is no school where lacquer making is taught. (4) Formulas you require will appear in an early issue of Industry.

2174 J. T. S., Mandalay—Process of deodorising coconut oil will be found in March 1935 issue of Industry.

2175 P. V. R., Narasipatnam—For improving your business advertise widely so that full publicity is given of your studio. As regards correspondence course fix the price as low as possible so that any man interested in the line can afford to pay. Advertise in the classified bargain pages of Industry and also send circulars to bonafide addresses.

2176 I. A., Bombay—Recipes of ringworm and eczema ointment and lotion will be found in Pharmaceutical Preparation published from this Office.

2177 B. M. W., Sivakasi—(1) Battery making machines may be supplied by Hans Blache, 3/4, Reichenberger Strasse, Berlin SO 36, Germany. (2) Formulas you require will appear in an early issue of Industry.

2178 H. S., Saran—Stationery goods may be had of D. N. Bhattacharjee & Sons, 33, Canning Street; Bepin Behary Das, 69, Radha Bazar Street, and E. B. Bros. & Co., 41 & 42, Canning Street; all of Calcutta.

2180 N. M., Anjar—Typewriter accessories may be had of G. Rogers & Co., 5, Dalhousie Square, Calcutta. For repairing typewriters consult a mechanic conversant in repairing typewriter.

2181 S. R., Allahabad—Import of mechanical matches has been prohibited by the match (Excise Duty) Act 1934.

2182 M. G., Nandyal—Match making machines may be had of Bhowani Engineering Co. Ltd., 56, Gouribari Lane, Shambazar, Calcutta.

2183 S. R. V. S. D. G., Krishna—For tractors and agricultural implements write to Volkart Bros., 11, Clive Street, Calcutta.

BATLIBOI'S MACHINERY

Diesel Engines, Flour Mills, Rice Mills, Dal Mills, Generating Sets, Pumping Sets, Hand and Power Pumps, Workshop Machinery, Printing, Paper Cutting, Book Binding Machinery, Brads and Ribbon Making, Soap Making, Electric Motors, Generators, Electric Tools, Welding Plants, Flexible Shafts, Plating Machinery and Materials, and every type of Woodworking and other Industrial Machinery.

BATLIBOI & COMPANY, Engineers,

Forbes St., Fort. Bombay and 4/153, Broadway, Madras.

2185 S. A. A., Rajahmundry—(1) An article on potato cultivation will appear in an early issue of Industry. (2) For selling clay of different kinds communicate with Calcutta Mineral Supply Co Ltd., 31, Jackson Lane, Calcutta. (3) You better advertise for graphite and mica mining. (4, 5 & 6) We are not aware of any such gum. (7) You may consult Poultry Farming published from this Office. (8) Wants to be put in touch with the suppliers of second-hand magic lanterns. (9) You may consult Industry Year Book & Directory for 1935 published from this Office.

2186 R M G., Dacca—We are not aware of any such reliable firm that sells hosiery machine on guarantee to buy the products from the machine buyer at fixed price. You can yourself come down to Calcutta and arrange with some hosiery merchants for selling socks made by you.

2191 B. M., Rajnandgaon—Process of manufacturing all sorts of soap will be found in Manufacture of soap published from this Office. For practical training in soap making you may write to Mr. R. Ghose, 8, Kripanath Lane, Calcutta.

2193 S. G. S., Jammu Tawi—(1) Playing cards may be supplied by Universal Playing Card Co Ltd., Crown Point Works, Leeds and Goodall Chas & Son Ltd., 110, Bunhill Row, London E. C. 1. (2) For ludo, snake ladder boards write to Chad Valley & Co. Ltd, 120, New Gate Street, London E. C. 1

2194 C. S. R., Sambhar Lake—You may consult Osaka Trade Index published by Osaka Commercial Museum, Osaka, Japan and Kelly's World Directory published by Kelly's Directories Ltd, 186, Strand, London W. C.

2197 S. S., Kalaswala—You may start either soap factory or hosiery factory. But for hosiery factory you have to invest large sum. But in case of soap making you may start the factory with Rs. 500 to Rs. 1000 and you will get a net profit of Rs. 2/- per day. In this connection you may go through Manufacture of Soap published from this Office.

2202 W. B. D. S., Kandy—(1) Following is a list of electroplaters: Baboo Dhondt & Co., Garden Road, Karachi; Economic Electroplating Works, 25/1/1, Free School Street, Calcutta, General Electroplating Works, 16, General Patters Road, Mount Road, Madras; India Platers Ltd, 12/1C, Lindsay Street, Calcutta and Practical Electro Plating Works, 90/10, Upper Chitpur Road, Calcutta. (2) Electroplating Chemicals may be had of S. Mitra & Co, 30, Bentinck Street, Calcutta. (3) Cigarette making machines may be had of T. V. Lynn & Co, 58, Forbes Street, Fort, Bombay and Mousell & Co. Ltd., Mercantile Bldgs, Lal Bazar, Calcutta. (4) Cigarette paper may be supplied by The French Cigarette Paper Co. Ltd, 49A, Rectory Grove, Clapham, London S. W (5) Tobacco may be had of India Leaf Tobacco Development Co. Ltd., Virginia House, 37, Chowringhee, Calcutta. (6) Homeopathic medicine may be had of C. Ringer & Co, 23, Lal Bazar Street, Calcutta and King & Co, 90/7/A, Harrison Road, Calcutta. (7) Surgical instruments may be had of Chemical & Surgical Works, 16, Chittaranjan Avenue South, Calcutta and B. K. Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta. (8) Wants to be put in touch with the importers of Japanese drugs

2203 U. P. G. W., Bahjoi—Glycerine may be had of Allied Agency, 16, Bonfields Lane and Bengal Chemical & Pharmaceutical Works Ltd, 31, Chittaranjan Avenue; both of Calcutta.

2206 N. A. K., Baroda—Burnt rice husk may be utilised as a good manure

2210 S. M. E. W.—For producing bright red rubber stamp ink use Eosin B B. N.

2212 R. D. V., Baroda—Recipes of boot polish will be found in December 1934 issue of Industry.

2214 B. V. N., Bellary—(1) Sewing thread may be had of Bharat Trading Co., 22, Sukeas Lane, Calcutta and Karim Bux & Elahi Bux Bros. 58/4, Canning Street, Calcutta. (2) Colour may be had of Dadajee Dhackjee & Co., 4, Armenian Street and Fuzlehussain & Bros., 44, Armenian Street; both of Calcutta.

TOILET SOAP BASE.

Manufacturers and Dealers

Do away with the laborious task of soap boiling. We will supply you with perfect toilet soap base (Chips), ready for passing through your mulling plant. Most economically without trouble, you can prepare your own toilet soap with your own brand. Even if you do not own a soap milling plant, we will supply you with a perfect toilet soap, with your own name. We would perfume the soap to your choice, and the colour too, you could suggest. Our soap base is guaranteed for purity, being made under the supervision of a qualified Chemist. Ask for samples and prices:

New Milling and Plodding Soap Machinery Just received, for sale. Moderate price.

TOMSON & CO., Soap Suppliers, 129, Khetwadi, Bombay 4.

2215 A. C. G., Imphal—Process of clarifying honey will be found in May 1934 issue of Industry.

2222 C. S. N., Sangamner—Process of manufacturing soap with groundnut oil will appear in an early issue of Industry.

2223 P. D. T., Secunderabad—For straw hat write to Lincoln Bennett & Co. Ltd., 24, 25 & 26, Nelson Square, Blackfriars Road, London S. E. 1; Hurst Hat Manufacturing Co. Ltd., Union Road, Hurst, Ashton-under Lyne, and Takahashi Scibosho Ltd., 70, Zengenjicho 9-Chome, Kitaku, Osaka, Japan.

2224 K. B., Sialkot—(1) Formula of rubber solution will appear in an early issue of Industry. (2) Vernacular equivalent of the chemical is not available. (3) You can utilise local tobacco in making hooka tobacco and in making surti, zarda, etc. chewing tobacco and not cigarette. (4) Process of manufacturing dyes is too technical and cannot be carried on successfully in India at present. (5) You can do some agency business; for terms, etc you may communicate direct with the parties. (6) Recipes of face powder will be found in September 1935 issue of Industry. (7) Process of manufacturing toilet soap will be found in Manufacture of Soap published from this office.

2225 B. B., Kottai—(1) Process of manufacturing plaster of Paris will appear in an early issue of Industry. (2) Process of making hair dyeing oil and powder will appear in an early issue of Industry. (3) You can import novelty and fancy goods from Japan. You have to send bank drafts to the dealers in Japan who will send goods to some parts in India. There you will take help of some clearing and forwarding agents who after clearing the consignment will send it to your address. Wholesale dealers do not generally sell less than one case

(4) We cannot vouchsafe opinion regarding reliability of Premium Bonds issued from foreign countries. (5) Derby Lottery tickets are sold by Royal Calcutta Turf Club, 11, Russell Street, Calcutta. (6) For finding a market for Indian herbs you may negotiate with Indian Trade Commissioner, India House, Aldwych, London W. C. 2.

2226 K. D. H. M., S. Cochin—An article on envelope manufacture appeared in August 1934 issue of Industry. Machines may be had of Oriental Machinery Supply Agency Ltd, 20, Lall Bazar Street, Calcutta. Paper may be had of C. M. Sur & Co, 105, Radha Bazar Street and Nilmoney Halder & Co, 105, Radha Bazar Street; both of Calcutta.

2227 P. L. C., Lahore—Process of enamelling on gold will appear in an early issue of Industry.

2228 S. K. M., Bombay—(1) Wants to be put in touch with the suppliers of clips and hooks to be used by tailors. (2) Wants to be put in touch with suppliers of tapes to be used in mats. (3) Your query is not in our line. (4) For training in commercial line you may write to Sydenham College of Commerce and Economics, Bombay. (5) You may refer your query to the Principal, Government Commercial Institute, 11, Hastings Street, Calcutta. (6) We are not aware of any such publishers. (7) In appointing an agent you need not give power of Attorney. (8) You can use any special mark for each consignment. (9) You better go through Railway Act. (10) Bill of Lading including a through bill of lading requires 4 as. stamps; but if a bill of lading is drawn in parts, the proper stamp therefore must be borne by each one of the set. (11) We are not aware of any such party. You may however communicate with book publishers.

2229 V. N. P., Baroda—A good formula of printing ink will appear in an early issue of Industry.

2230 G. S. R., Indore—(1) You may use yarn of 90 counts for making thread balls. For yarn write to Calico Mills Ltd., Ahmedabad. (2) Process of making office paste will be found in February 1935 issue of Industry. (3) A formula of toilet soap will be found in February 1935 issue of Industry. In this formula you may use mohua oil in place of tallow. (4) Your query is unintelligible. (5) For Derby Sweep tickets write to Royal Calcutta Turf Club, 11, Russell Street, Calcutta. (6) We do not know.

2231 T. N. M., Kumira—Scarlet dye may be had of Fuzlehussain & Bros, 44, Armaman Street, Calcutta. Yes 1 quart is equal to 40 Fl oz or 20 Chatak.

2232 C. L. K., Kohat—(1) Formulas of toilet preparations will be found in September

S. H. Kelkar & Co.



36, Mangaldas Road,
Bombay No. 2.
Wholesale Importers and
Stockists of

Essential Oils, Aromatic
Chemicals, Synthetic Per-
fumes, Flower Ottos, Soap
Perfumes, Oil colours and
all sorts of Perfumery Raw
Materials required for Per-
fumes Soap Makers, Agar-
bathi Manufacturers, etc,
etc.

Prices and other Particulars
on Application.

1935 issue of Industry. (2) We have some industrial books which contain formulas you require. (3) You may also consult other industrial books which may be had of Chakravorty, Chatterjee & Co Ltd, 15, College Square and D. B. Taraporevala Sons & Co Taj Building, 210, Hornby Road, Bombay

2233 S. P. D. R., Satankulam—You may try with tartaric acid for making curd milk Your other query is in the nature of an advertisement. You better write to different manufacturers for sending you samples.

2235 P. N. M., Amritsar—(1) Use of hair dye will not affect black hair but will stain the scalp. One application of hair dye will last for one week. Dissolve the powder in water and apply with brush

2240 M. W., Bhopal—You may consult The Exposition of Match Industry by P C Roy to be had of Bengal Trading Syndicate, 5 & 6, Hare Street, Calcutta.

2241 A D A., Alipore—You may buy an atta grinding machine which will be worked by electricity.

2243 S. K. M., Andheri—(1) In shipping trade a proforma invoice would be made out when it was desired to ascertain what the total cost of a shipment of goods would be, including all charges upto delivery to the customer (2) Consignment invoice is sent to an agent when goods are sent to him, to be sold by him on the owner's behalf at the best price he can get. (3) A credit note is a document sent to the buyer by the seller in cases where an allowance is made on account of (a) the return of the goods or part of them; (b) the return of empty cases or packing materials which have been charged or (c) an agreed upon allowance for shorts, damages, etc (4) You may consult Theory and Practice of Commerce by Prof J. C. Mitra published from this office (5) For copy hand press and other accessories write to Nilmony Halder & Co, 106, Radha Bazar Street, Calcutta (6) Stamp duty on demand draft is 1 anna For other queries consult a lawyer.

2246 S. K. M., Anderi—Thank you for your valuable suggestion

2248 F. R., Kalaw—In developing box camera films and plates you have to adopt the general process of developing and printing ordinary films and plates.

2249 S. A., Jubbulpore—For grinding machines enquire of Marshall Sons & Co, Ltd., 99, Clive Street and Krupp India Trading Co, Ltd., 29, Strand Road; both of Calcutta

2251 S. D., Mandi—Yes, you may manufacture washing soda in your place For this purpose it is advisable for you to appoint a chemist in the beginning. He will supply you with an estimate showing you the prospect of the indus-

try. Washing soda is manufactured by The Indian Chemical Works, Cawnpore and D Waldie & Co, Ltd, Konnagar, E. I. Ry.

2253 U. C. W., Patna City—(1) Bottles and corks may be had of Shah & Co, 55, Ezra Street, and Sikri Bottle Store, 9, Ezra Street; both of Calcutta. (2) Tablet and pill making machines may be had of Dr Bose's Laboratories Ltd., 45, Amherst Street and Gopal Chandra Dass & Co., Ltd., 86, Clive Street; both of Calcutta.

2255 S. M. S., Bombay—For enamelled jewellery write to Chitalia Brothers, 166, Harrison Road, Calcutta

2258 G. J. N., Parvatipur—Processes you require will appear in an early issue of Industry.

2259 J. M. B. R., Dehiwala—For bleached shellac write to Banshidhar Dutt & Sons, 126, Khengrapatty, Barrabazar, Calcutta; Akhoy Kumar Laha, 1, Dharamtala Street, Calcutta and Abinash Chandra Dutt, 23-2, Dharamtala Street, Calcutta.

2260 L. K. G., Rajkot—Process of bronzing and browning instruments will appear in an early issue of Industry.

2261 J. C. S., New Delhi—Carbolic acid, creosote oil may be had of Bengal Chemical & Pharmaceutical Works Ltd, 31, Chittaranjan Avenue, Calcutta (2) For gallon tins write to Metal Box Co., of India Ltd., B2, Hide Road, Kidderpore, Calcutta.

2262 S. S. S., Ellore—For threadball making machine write to Oriental Machinery Supply Agency Ltd, 20, Lall Bazar Street, Calcutta

2264 J. B. D. C., Panipat—(1) In making artificial gold you have to use platinum metal. Tungstic acid may be had of Hamilton & Co. Ltd, 8, Old Court House Street, Calcutta. You may again fuse the granules of artificial gold and make into a mass.

2268 P. C. V. B., Cocanada—(1) Power looms may be had of H. M. Mehta & Co., Apollo Street, Fort, Bombay; Textile Machinery &

GOLDEN OPPORTUNITY.

To all cotton merchants, exporters, consumers, in India and abroad, to entrust any kind of work such as Surveys, Arbitration dispute, Claims, Sales and Purchases in Bombay Markets, and Africa, Egypt, American centres, Foreign Exports and Imports, transit and despatch, reliable market opinion and telegraphic information. Write to K. B. KOTAK, Lalit Block, Ville Parle, (India)—35 years expert in the line a Surveyor and Arbitrator of the East India Cotton Assn., and adviser in all kinds of business such as Gold, Silver, Seeds, Wheat and Sundries.

Stores Co., 1, Apollo Street, Fort, Bombay and W. H. Brady & Co., Ltd., Church Gate Street, Bombay. (2) Following is a list of weaving establishments. Sundareswara Weaving Estd., Chovva, N Malabar, Vishnu Weaving Works, Chovva, Cannanore, Malabar; Taj Mahal Weaving Factory, Baliapatam, Cannanore; Coimbatore Weaving Syndicate, Coimbatore, and Calcutta Textiles, Cannanore, Malabar

2269 B. R. M., Jubbulpore—(1) Fountain pen engraving machine may be had of B. M. Sarine & Co., Lakhmandas Bldg. Mangaldas Road, Kalbadevi, Bombay 2.

2270 G. P. G., Ambala City—(1) For German silver sheets write to Balmer Lawrie & Co., Ltd., 103, Clive Street and Gopal Chandra Das & Co., Ltd., 86A, Clive Street; both of Calcutta. (2) Wants to be put in touch with the dealers in Nurnberg gold.

2271 H. B. H. K., Katmandu—As far as I understand the polish manufactured by you has not been completely saponified. For complete saponification boil the wax and caustic soda lye.

2272 M. N. D., Lahore—Indigo carmine may be had of Fuzlehussain & Bros., 44, Armenian Street, Calcutta. In place of indigotin you may use indigo carmine in making blue black ink.

2275 M. J. R., Tinnevely—An article on watch industry will appear in an early issue of Industry. Wants to be put in touch with the suppliers of aspin wood and match splints

2276 D. S. B., Morar Cantt.—An article on envelope manufacture appeared in August 1934 of Industry.

2277 A. S., Najibabad—(1) For aluminium pots write to Aluminium Manufacturing Co., Ltd., 9, Clive Street and Jeewanlal (1929) Ltd., 11, Clive Street; both of Calcutta. (2) Wide mouthed glass bottles may be had of Shah & Co., 55, Ezra Street, Calcutta.

2281 L. R. I., Dera Ismail Khan—English equivalent of Squill is onion which is known

as Peyaj Hindi equivalents of other ingredients are not known.

2282 T. K. J., Sukkur—Process of mercerising yarn will be found in September 1935, issue of Industry.

2285 M. F., Jharsuguda—(1) It is not possible to manufacture white catechu with black catechu. (2) A formula of battery solution appeared in August 1935, issue of Industry. (3) You may use sandal oil, musk, ambergris, etc., as fixing agent for hair oil. Any one of these will do. (4) For tin boxes and bottles write to Shah & Co., 55, Ezra Street, Calcutta. (5) You have to use thermometer for ascertaining the heat. (6) Melt glass and pour in moulds for making types of glass. (7) It is not possible to start rubber stamp making with Rs. 25/- only. (8) You may use sulphuric acid.

2286 M. L., Muttra—(1) Whenever you require any address write to us when we shall supply you the same. (2) For Dietz lanterns write to Volkart Bros., 11, Clive Street, Calcutta.

2392 Y. D., Gurukul—(1) In making lozenges you should use double refined powdered sugar. (2) The washing soap sent by you contains no perfume. (3) You may add lavender 2 parts and sandal oil 3 parts to produce the desired perfume. (4) Industrial machines may be had of Rustomji Nowroji Bapasola, 62, Forbes Street, Fort, Bombay.

2297 T. P., Benares City—You may use amla oil for blackening grey hairs.

2299 M. A., Delhi—(1) For the industrial machineries you require write to W. J. Alcock & Co., 7, Hastings Street, Calcutta; Oriental Machinery Supply Agency Ltd., 20, Lal Bazar Street, Calcutta and Marshall Sons & Co., Ltd., 99, Clive Street, Calcutta. (2) You may consult Dry Cleaning Garment Scourer by William Brannt. (3) Shoe lace is manufactured by Farashgunj Braid Factory, 43, Malakartola, Dacca, G. B. Ghose & Co., 2, Madan Mohan Dutt Lane, Calcutta and Cawnpore Lace Works Ltd., 105/716, Kalpi Road, Cawnpore.

2301 R. N. B., Delhi—Oil lavender, essence, ambergris and oil carraway may be had of Paradise Perfumery House, 75, Colootola Street, Calcutta and Sikri & Co., 55/8, Canning Street; both of Calcutta.

2304 C. E. I. C., Ernakulam—Your enquiry is not in our line.

2305 J. M. B. R., Colombo—For vacuum packing machine write to W. J. Alcock & Co., 7, Hastings Street, Calcutta.

2307 M. C. H., Montgomery—Sola hats are manufactured by Premier Hat Manufacturing Co., 11, Balu Hakkok Lane, Calcutta and Bengal Eastern Hat Manufacturing Co., 17, Komedan Bagan Lane, Calcutta.

METAL CAPSULES

Give beauty to the bottle, safety and superiority to the product. Choice colours. Very economical. Can be imprinted with your Name.

Send specimens for quotation and state yearly quantity required.

Other Products

Tooth-paste Tubes, Crown Corks, Vico Capsules, Seals, etc.

SONI METAL WORKS
Post Box 736, Bombay.

AGENTS & DEALERS WANTED.



2310 A. R., Shahabad—For mixing machines write to W. J. Alcock & Co. 7, Hastings Street, Calcutta. Soap stamping machines may be had of Small Machinery Manufacturing Co., 22, R. G. Kar Road, Calcutta.

2312 S. M. S., Bombay—Refer your query to the Superintendent, Patent Office, 1, Council House Street, Calcutta.

2314 D. P. E., Tinnevely—Process of making photo on silk will appear in an early issue of Industry.

2316 H. H. M., Tanda—(1) Proof spirit is a mixture of equal bulks of alcohol and water (2) Gora and pati limes are two varieties of lime. (3) Take a tub and fill it with water and place on fire. Now put in the tub another vessel containing the ingredients to be heated on water bath. (4) You have to arrange to heat by steam i.e., you have to pass the steam in pipe so that the ingredient may be heated by coming in contact with the heat of the steam (5) Adjust the filter paper on the mouth of the funnel. (6) Benzoic acid is used as a fixative agent.

2318 A. M., Multan City—(1) Wants to be put in touch with the suppliers of moulds for making artificial fruits of khoya in Lahore, Karachi, Amritsar and Delhi (2) Fruit essences may be had of Paradise Perfumery House, 75, Colootola Street, Calcutta. (3) Waste products have some use such as horn may be utilised in making combs, pen holders, handles for knives, etc. Used motor car tyres may be used in making soles of canvas shoes. You may obtain gold and silver by burning gold and silver lace. Oil may be extracted from neem seeds. (4) You may refer your query to the Director of Public Instruction of different provinces. (5) Your query is not in our line (6) You may refer your query to the Indian Trade Commissioner, India House, Aldwych, London. Methods of exporting goods appear in Readers' Business Problem. (7) Castor seeds are exported to France, Germany, United Kingdom. Honey is also exported to United Kingdom.

2319 S. G. D. S., Saugor—(1) We are not aware of any press where training in lithography is given. (2) Process of making silver polish on wood will appear in an early issue of Industry. (3) An article on art of lithography appeared in June 1931 issue of Industry. If you go through the article you will get all the information you require. Litho machines may be had of John Dickinson & Co. Ltd., Grosvenor House, 21, Old Court House Street, Calcutta.

2320 R. R., Thamail Lodge—You need not require any machine for making papier mache. Papier mache may be produced on a small scale by boiling white blotting paper with water, and heating it till it is disintegrated. The mineral

substances used are China clay, chalk, gypsum, barytes, ochre, etc. The adhesive materials are glue casein, gum, starch, paste, dextrine, etc. You may work the following recipe: Paper pulp, 22 parts; clay 37 parts; casein 37 parts, water 4 parts. Take the pulp in a suitable container, pour the water, and add the adhesive and mix. Next add the remaining ingredients and incorporate to the consistency of mortar. The mixing is of course performed by means of a kneading machine.

2321 H. C., Delhi—A formula of label paste will appear in an early issue of Industry.

2322 P. K. S., Dacca—Pure blue may be had of Fuzlehussain & Bros., 44, Armenian Street, Calcutta. You may use dust of rusted iron. Tauri is a Bengali word.

2323 I. S., Amritsar—Refer your query to the Consul-General for Germany, 26, Lee Road, Calcutta.

2324 P. N. P., Kathmandu—For the machines you require write to W. J. Alcock & Co., 7, Hastings Street, Calcutta. Process of stiffening paper and cloth will appear in an early issue of Industry.

2327 S. D. A. G., Kandana—An article on dry cell making appeared in May 1934 issue of Industry. If you go through that article you will get all the information you require. Caps are made of brass.

2329 V. D., Feroke—Hessian and jute yarn may be had of Bird & Co., Chartered Bank Bldgs, Clive Street, Calcutta; Birkmyre Bros., 6, Clive Row, Calcutta and N. R. Ghose, 71B, Clive Street, Calcutta.

2331 R. M. D., Amalner—You may consult Pharmaceutical Preparations published from this Office.

2332 S. P. W., Salur—(1) For mantle knitting machines write to W. J. Alcock & Co., 7, Hastings Street, Calcutta. (2) Outfits for reinforced concrete articles may be had of Balmer Lawrie & Co. Ltd, 103 Clive Street, Calcutta (3) Following is a recipe of gramophone record reviving solution: Gasolene 2 parts; kerosine 1 part. Mix together. Give it a reddish tint with alkanet root by allowing it to stand in the mixture for a few days to reach



SAPAT LOTION

MEANS

A radical cure for RING-WORM and all sorts of Skin diseases.

Price 1 oz. As. 0-6-0
" 4 oz. Rs. 1-1-0

Postage Extra
SAPAT & CO., (I),
Bombay 2.

the desired colour. Shake frequently during this period (4 & 5) Perfumes may be had of Paradise Perfumery House, 75, Colootola Street, Calcutta (6) Enamelled sign boards may be had of Sur Enamel & Stamping Works, 9, Middle Road, Entally, Calcutta. Printed tin cans may be had of Metal Box Co. of India Ltd., B2, Hide Road, Kidderpore, Calcutta. (7) Eucalyptus oil may be had of Coonoor Eucalyptus Oil Distillery, Coonoor, R. S., Nilgiris, and Fern Hill Essential Oil Distillery Co., Fern Hill, Nilgiris (8) A good recipe of vaseline pomade will be found in December 1934 issue of Industry. (9) Alcohol may be had of D. Waldie & Co., 8, Clive Street, Calcutta. (10) Process of making gelatine capsules will be found in July 1933 issue of Industry. (11) A good recipe of hair dye will be found in May 1934 issue of Industry (12) Formulas of lime juice glycerine, and lavender water will be found in September 1935 issue of Industry.

2333 B. V. N., Bellary—You better write direct to the company.

2334 P. K. N., Nilgiris—Barbed wire may be had of Indian Steel Wire Products, Tata-nagar, B. N. Rly.

2337 B. L. M. C., Bombay—Formulas you require will appear in an early issue of Industry.

2341 M. A., Secunderabad—Refer your query to the Consul-General for Japan, 26-27, Dalhousie Square, Calcutta.

2342 E. A. A., Lucknow—In manufacturing slate you may use carbon black. Slates are manufactured by B. D. Manufacturing Co., Agra; Bengal Slate & Cards Co., 137, Howrah Road, Howrah; Bengal Slate Works, Jamal-khan, Chittagong, and K. B. Nath & Bros., Sialkot City.

2344 J. S., Rawalpindi—You may write to Indian School of Accountancy, Post 2020, Calcutta; The School of Accountancy, 782, Bush House, London W. C. 2, and International Correspondence Schools Ltd., International Bldgs., Kingsway, London W. C. 2.

2345 R. R. B., Masimpur—(1) You may consult Baxter-Practical and Up-to-date Receipt Book for Bakers. (2) Process of making papadams will be found in September 1935 issue of Industry. (3) You may write on clock dial

with printing ink. (4) Process of making and refining sattu food will be found in Utilisation of Common Products published from this Office.

2347 G. K. C., Chandalur—Process of extracting eucalyptus oil will be found in March 1934 issue of Industry.

2348 M. S. P., Baroda—Process of manufacturing crayons will be found in Prospective Industries published from this Office.

2349 C. C., Madanapalli—Labels may be had of Shah & Co., 55, Ezra Street, Calcutta, and All-India Bottle Supplying Co., 135, Chuckla, Bombay 3.

2350 V. D., Feroke—Vide No. 2329 above.

2355 T. S., Wakema—(1) Heat thin leaf of copper to red hot and plunge it in sesamum oil, butter-milk, cow's urine, decoction of dolichas biflorus, fermented paddy water and lemon juice respectively 7 times in each. By this copper will be purified. Rub purified mercury and sulphur equal in weight to the copper, with lemon juice and prepare kajjali. Smear this kajjali over the purified copper leaf and subject it to severe heat in a covered crucible. Repeat this process for 10 times, when copper is reduced to powder. Grind the prepared copper with lemon juice and make it into a ball. Insert this ball into a tuber of Arum companulatum and subject it gajaputa, when the reduced copper is freed from toxic effects and become fit for internal use and is known as tamrabhasma. (2) Wants to be put in touch with the suppliers of leather of tiger, deer, and stag, etc (3) Wants to be put in touch with dealers in stamps in foreign countries.

2357 G. K., Jullundur City—You can use the following solution: Gasoline 2 parts, kerosine oil 1 part. Mix together. Give it a reddish tint with alkanet root by allowing it to stand in the mixture for a few days to reach the desired colour. Shake frequently during this period. Use this solution to revive old gramophone records.

2359 T. S. N. S., Markapur—For slate making machine write to W. J. Alcock & Co., 7, Hastings Street, Calcutta.

2360 J. R. M., Colombo—You may use pumps which may be had of Indian Pump Co., 8, Prince Anwar Shah Road, Tollygunge, Calcutta; Mather & Platt Ltd., 7, Hare Street, Calcutta, and M. S. Vernal & Co., Bharat Insurance Bldgs., Chittaranjan Avenue South, Calcutta.

2361 M. S. D. M., Galle—All the ingredients you require may be had of Banshi Dhar Dutt & Sons, 126, Khengrapatty, Barrabazar, Calcutta, and Paradise Perfumery House, 75, Colootola Street, Calcutta.

2363 B. J. B., Jamshedpur—(1) You may write to Bengal Poultry Dairy & Agriculture

Chemicals for

MATCH WORKS,
RUBBER WORKS,
GLASS WORKS,
MITRA BROTHERS,

17-19, R. G. KAR Road, P.O. Shambazar,
Calcutta. Phone: B.B. 682.

Industry

THE MAGAZINE FOR MANUFACTURERS & BUSINESSMEN.

VOL. XXVI.

CALCUTTA, DECEMBER, 1935.

No. 309.

Pursue Constructive Enthusiasm.

FATHER'S calling induces the teeming millions of India to agriculture. They scratch the hard soil of a sun-baked tropical country in the way their forefathers did four thousand years ago. They cast their seeds as their forefathers used to do and bid their time keeping their eye on the favour and disfavour of the rain-god.

This makes India—"the pre-eminently an agricultural country"—where three-quarter of the people live on and die by agriculture.

Agriculturists as the word really signifies and as others in different countries understand by it, they are not. No training about the soil, no manuring of the field for intensive growth, no tilling which usefully tills the land, no efficiency operation which forces land to maximum growth are parts of their occupation. They continue their fathers' work as the fathers did. The result has now become patent—half a meal a day when available and no work for over half the year.

India already has a population of 350 million. And with the increasing balance of birth over death in spite of hunger and pestilence from which the millions suffer from year's end to year's end, the Health Commissioner with the Government of India calculates that by the time of the next census in 1941 the population will increase to 400 millions. Yet although most of our land is capable of 3 crops we do not get more than one crop and leave about one fourth of our culturable land uncultivated.

Increasing man power is a blessing to most countries—to us it has become a curse. Without production work we do find means of mutual quarrel.

We must grow more crops per acre—we must add more acres to our cultivated lands. Cattle has grown uneconomical in our country—our agriculture will soon be similarly uneconomical if we, even now, do not take care of it, and equip ourselves with adequate knowledge.

Prepare your manure, intensively manure your fields, force your fields to grow more. Here is the work for the educated ones—the country may be saved if practical education spreads and practical producing work pursued in a spirit of constructive enthusiasm.

THE MANURE INDUSTRY.

NEED FOR MANURING.

CONSIDERABLE attention has of late been accorded to the subject of manures by our agricultural experts and there cannot be two opinions as to the desirability of utilising a greater amount of manure—so inexpensive and at the same time so efficacious—in the agricultural operations. More than seventy per cent. of the Indian population derives their livelihood by agricultural occupations. It is a fact which goes without contradiction that notwithstanding the far from satisfactory conditions of the people, no systematic attempt is made to make two blades of corn bloom where only one grew before. Leaving aside the question of the vast area of land lying waste and awaiting development, one is grieved to find the average yield of the principal crops of India falls far short of the international average. To cite a few examples, in Bombay and United Provinces the yield of wheat per acre is only 1250 lbs. as compared with 1,973 lbs. per acre in the United Kingdom and 2,874 lbs. in Belgium. Average Indian yield of barley, sugar, etc. leaves much room for improvement. Even the average production of rice, it is stated, in India is half of what it is in Japan. And this in spite of an immense store in the country of manures of all conceivable sorts.

The present time is appropriate for exact knowledge on the profitable use of fertilizers. The world fall in the prices of agricultural commodities calls essentially for more effecient methods of agri-

cultural production. In India with a low standard of yield per acre such an increase in efficiency is frequently synonymous with an increase in yield. This may seem paradoxical when the world's production of agricultural commodities appears to be greater than the effective demand, but even in times of depression the economic production of the required amount of a given commodity on a smaller area is much to be desired in India where the pressure on the land is intense and when insufficient areas are devoted to fodder crops for the live-stock of the country and to accessory foodstuffs for the human population.

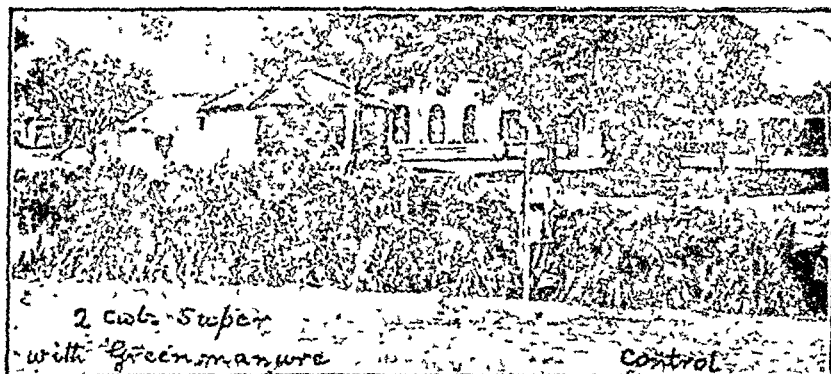
SOILS.

Soils consist of mineral matter derived from rocks, the calcium carbonate, calcium phosphate, and organic matter obtained from marine and other organisms, the soil water, and the residues of materials grown on the soils.

The main soil is generally divided into three classes: clay, loamy and sandy. In addition to these classes are marls containing from 5-20 per cent. calcium carbonate, the rest being silt and clay; calcareous soils, containing more than 20 per cent. calcium carbonate and party or humic soil which have more than 20 per cent. humus. Sandy soils contain less than 6 per cent. of clay, loams from 6-15 per cent. clay, and clay land from 15-25 per cent. clay, but sometimes considerably more.

PROPERTIES OF SOIL.

Before considering a specific fertiliser, the agricultural value of different



Green Manuring.

soils must be reviewed. The general characteristics of a clay soil are fine texture and cohesion of the particles, It absorbs moisture from the air and draws it from the lower soil by capillary attraction, and retains water obstinately. If worked while wet it becomes hard and intractable. A sandy soil has little adhesion of particles, attracts little or no moisture from the air, and allows water to percolate through it readily, thus causing loss of fertilising elements by leaching. It absorbs and retains heat well and is dry and warm, easily worked and will not bake. Its power of drawing moisture from below is about two-thirds that of clay. Soils intermediate between sand and clay take, in a modified way, the main features of both.

For purposes of agriculture the circulation of moisture in the soil and the temperature are of greatest importance. A soil having clay as its predominant constituent holds its water almost stationary, and when subjected to evaporation, through heat or drying winds, bakes badly. The soil water contains fine particles of clay in suspension and these are drawn to the surface and de-

posited by the evaporation of the water, thus forming an upper layer no longer porous. Evaporation ceases. The soil moisture, only a few inches below the surface, remains quiescent, and the closely packed upper layer also excludes heat and gases, the soil becomes cold, and those chemical processes necessary for the preparation of plant food in an assimilable form cease.

The best known remedy is application of lime which throws down the suspended clay in the form of small granules thus opening the pores of the soil and enabling a free circulation of water and the admission and action of gases and sunlight. With sandy soils evaporation does not bake and the movement of the soil waters is accelerated but there is danger of exhausting the supply as the power of capillary attraction in this case does not greatly exceed a depth of 20 inches. These soils give free play to the action of gases and sunlight and maintain a temperature favourable for vegetation.

Excessive evaporation is prevented by thorough tilling; a surface layer finely pulverised earth a few inches

ments, etc.; (4) making the soil acid or alkaline according to the nature and circumstances of the case.

Manures are used in practice for the following reasons:—

(a) To supply crops with readily available food

(b) To enable crops to make the most of their short growing period by supplying available food just when most needed.

(c) To give each crop just what it has most difficulty in getting for itself.

(d) To keep up the original fertility of the soil.

These reasons apply most directly to crops grown on arable land in ordinary rotation

CLASSIFICATION OF MANURES.

The word manure in its general sense possesses more far-reaching meaning than it is supposed to stand in for trade and industry. Manures are mainly classified under the following heads:—

1. Natural or organic manures.
2. Artificial manures.
3. Mineral manures.

NATURAL OR ORGANIC MANURES.

In this class may be included all farmyard manures, litter, human excrementitious matter, blood, animal refuse, fish guano, oil cakes, etc. In fact all kinds of organic refuse whether of vegetable or of animal origin may be employed as manure.

FARM YARD MANURE.

Farm yard manure is the mixture of the liquid and solid excrements of farm animals with straw, etc., used as a litter. It is regarded as the typical manure by farmers and others because it is supposed to contain all the ingredients required for the growth of crops, and also because it causes a certain amount of disintegra-



Manured Soil.

tion of the soil as well as warming certain lands. Still, it is far from being a perfect manure. Farm yard manure may contain all the ingredients of plant growth but they are not present in the best proportions. The composition of farm yard manure varies considerably.

The composition naturally varies with the nature of the animal making the dung, the kind and amount of food it receives, the proportion between excreta and litter, the nature of the litter, and the extent and character of the decomposition which has taken place in the nature itself. The utility of the manurial constituents varies according as they are present in the food as digestible or indigestible compounds, for example, part of the proteins of the food withstand the action of the digestive ferments and are excreted unchanged in the faces, but to a much greater extent they are broken down into soluble compounds which pass into the blood and eventually are excreted as urea, uric acid, etc., in the urine. Similarly for the phosphoric acid and the potash in the food, whatever is digestible is excreted in the urine in some simple combination whatever resists digestion passes out unchanged in the solid excreta. Hence a great difference in the manurial value of the two portions of the excret the compound in the urine—urea, uric acid, soluble phosphates, and potash sal

are either ready for the nutrition of plants or require but slight further changes to become so, whereas in the solid dung the materials have several stages of decomposition to go through before they can reach the plant, and having already shown themselves able to resist the attacks of the animal's digestive ferments they are correspondingly unaffected by the ordinary decay processes in the soil. The proportion the digestible bear to the indigestible constituents of a food varies with the nature and even with the mechanical condition of the material, also the kind and age of the animal.

It has been ascertained that the urine of sheep and horses is much more concentrated than that of cattle and pigs, similarly the solid excreta of the two former are also the drier. It is this greater dryness and richness which is the cause of horse manure being described as "hotter" than that produced by either cows or pig; bacterial changes take place in it much more rapidly, a greater amount of ammonia is produced, and the rise of temperature is more pronounced.

The next factor which enters into the composition of the dung is the nature of the litter on which the animals are placed. The litter has a two-fold function: it absorbs the urine and other liquid portions, and it provides both organic matter and nitrogen for the resulting manure.

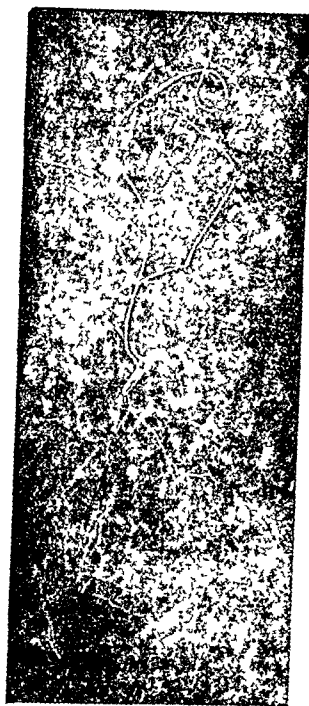
Howsoever the farm yard manure has been made, it thus starts a mixture of excrement, urine and litter which become more or less consolidated and mixed together by the trampling of the animals. Other changes, however, inter-

vene rapidly, and these in the main are brought about by bacteria, which for convenience may be divided into two groups, one acting on the cellulose and other carbon compounds of the straw that make up the bulk of the manure, and the other acting on the nitrogenous compounds that do not weigh so much but supply the main fertilising properties of the dung.

Farm yard manure thus owes its value partly to its chemical, partly to its physical, and partly to its biological effects. The elementary constituents are carbon, hydrogen, oxygen and nitrogen, which constitute the non-metallic part; potassium, phosphorous, calcium, which constitute the metallic part, both being of value; with some small amounts of aluminium, iron, and silicon which may be considered as having no value. These materials are combined together as humus, organic fibre and salts. Water is present to the extent of from 60 per cent. to 99 per cent. Farm yard manure is by no means a dead thing. It is full of bacterial life, which has a strong influence on its value. Considering, first of all, the forms in which these elements of value occur, we find that the nitrogen is very rarely indeed in the oxidized condition of a nitrate. Very old heaps of farm yard manure, say two years old, certainly do contain small quantities of nitrate, but this age is not usual in farm practice. An important fraction of the nitrogen is present in the form of ammonia, which chiefly occurs as the result of the decomposition of urea. Urea is fermented by a special micrococcus, so that in a day or so the urea has become completely converted into ammonium

carbonate. The ammonia so produced will very likely reach with some of the sulphate present, so that in the manure heap the ammonia will be partly as ammonium sulphate. In addition to this as the organic matter is decomposed by bacterial action, a portion of it will form those vague compounds which is known as humic acid, which will enter into combination with the ammonia and produce the soluble, dark-brown coloured substance, ammonium humate. Some nitrogen is also present in the amide form. Urea itself is an amide, but is not the only one present. Many other amides are produced by the action of bacteria upon proteins. Amino-acids and peptones are also present. A fair proportion of the soluble nitrogen which exists in the manure heap results from the bacterial digestion of the proteins. Many of the bacteria in the manure heap belong to the class that liquefy gelatine. The liquefaction of gelatine is only a special easily observed case of the peptonization of proteins, and a part of the proteins which have not been digested by the beasts goes into the peptone form in the manure heap. Of the albuminoids in the dung, some are soluble but most are not merely insoluble in water, but very resistant to all chemical change; indeed part of the proteins that are passed by the beasts is the residuum of dead bacteria, which needs protracted decomposition.

The basis of any scheme of manuring must in general be farm yard manure, and the success of the scheme will vary as this is well or badly managed. But unfortunately there is often more waste of farm yard manure than of anything



Sickly Plant Growing on Unfertile Soil.

else on the farm, and most valuers would reckon that half of its goodness never reached the crop at all. Probably in no single direction is so much improvement possible as here. As a general rule the richness of the manure depends on the amount of albuminoids or proteins in the food, and not on the amount of oil, because the albuminoids contain nitrogen, the most important constituent of the manure. Nowadays the potash is becoming increasingly important. The most economical procedure is to apply the manure at once to the land directly it is drawn out from the yards. The proper time for doing this depends on the " " and the climate.

INFLUENCE OF FARMYARD MANURE ON SOIL MOISTURE.

Farmyard manure has a marked effect upon the amount and distribution of soil moisture in cultivated fields. When coarse manure is ploughed under its first effect is to act as a mulch to the unstirred soil, by breaking the capillary connection between it and the surface layer. The tendency, therefore is to cause the surface soil to become drier, than it would otherwise have become in the same time, and frequently to an injurious extent, especially in time of spring droughts, before seeds have germinated or young plants have developed a root system reaching into the deeper soil. On such occasions as these, the heavy roller is of service in making a better capillary connection with the unstirred subsoil. On manured ground which is producing a crop, while a much larger yield of dry matter is produced per acre, the soil at the end of the growing season is found only a little drier, from which it follows, either that less water is required to produce a pound of dry matter in the rich soil, or else that the manure in some way makes more water available, and when the matter comes to the thoroughly understood, it is not improbable that both propositions will be found true.

COMPOSTS.

Composts are various substances mixed together and made into heaps. A kind of fermentation goes on in the heaps, peat, ashes, weeds, leaves, lime, etc., are the ingredients that enter into the composition of manures.

BLOOD MANURES.

The dried blood from slaughter-houses is sometimes used as fertiliser. To dry the material several methods are

resorted to; in some cases it is dried at steam heat and the product ground to powder, in others the blood is coagulated by heating it with a small amount of a ferric salt to dry it. The most satisfactory process is to dry it by means of lime. The lime, to the extent of 2 per cent., is mixed with the blood to form a cake which can be readily dried in air. The product of this method is stated to be superior to that obtained by using a ferric salt as it decomposes more rapidly in the soil, and it also contains a small percentage of lime.

ANIMAL REFUSE.

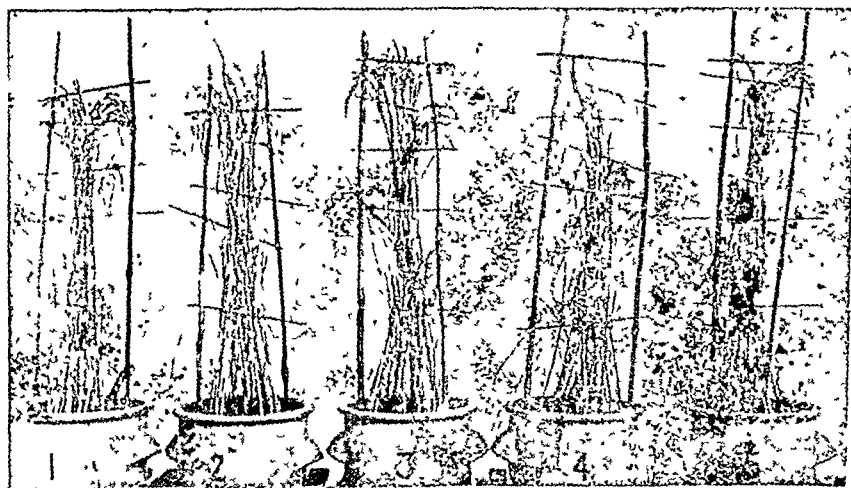
Hides, leather-clippings, hair, horn, etc., are best utilised in the form of composts. Their action is shown in the land, requiring a year or two for complete decomposition. On being treated with sulphuric acid they may be rendered easily assimilable.

FISH GUANO.

Fish guano is nothing but dried fish. It contains about $1\frac{1}{4}$ per cent. of nitrogen and 1 per cent. of phosphoric acid. It has been used with success as a manure for root and cereal crops. It is made on a considerable scale from various kinds of fish refuse. In making guano, generally oily fishes like cod, herrings, sprats, etc., are boiled and pressed for the sake of their oil, and the residue is dried, powdered, and sold as fish guano.

OIL CAKES.

The materials are generally used as cattle food, but some of them, for various reasons, are unsuitable for this purpose, and are often prepared for use as fertilisers. They are the by-products of the process for obtaining oil from seeds by pressing.



Paddy Growing with Compound Manure.

Rape Cake—This cake before using for manurial purposes should be ground. Rape cake decomposes slowly in the soil, yielding from 5 to 6½ per cent. of ammonia, and 3½ to 5 per cent. of phosphates of lime and potassium. Rape dust forms an excellent constituent of manures for wheat and potatoes.

Mustard Cake is produced from the mustard and also often forms good and cheap manures for cereal and other crops. They contain about 5 per cent. of ammonia, or nitrogen equal thereto.

Castor cake Meal.—This substance is the residue of the castor oil industry. Like other two cakes indicated above, castor cake meal gradually decompose in the soil. It contains nitrogen equal to 4½ to 5½ per cent. of ammonia.

COTTON SEED MEAL.

Cotton-seed meal is obtained by grinding the cake which is left when the oil is pressed out. Its chief uses are as a cattle food and as fertiliser. The meal damaged by overheating can be used only for fertiliser purposes.

The plant food in cotton seed meal is chiefly nitrogen, so that its fertilising value depends upon the quantity of nitrogen present. It contains however, an appreciable amount of phosphoric acid and potash.

In using cotton-seed meal as a fertiliser it must be borne in mind that it is essentially a nitrogen provider, hence if the soil requires phosphoric acid and potash as well as nitrogen, the meal should only be used in connection with some form of fertiliser furnishing these other materials.

ARTIFICIAL MANURES

Artificial manures may be divided into:—

1. Phosphatic manures.
2. Nitrogenous manures.
3. Potash manures.
4. Compound manures.

Artificial manures act in various ways:—as direct plant foods, making good the soil's deficiencies; as stimulant and aids to digestion of some of the soil'

otherwise inert constituents, as improvers of the soil's texture, and as attractors of moisture from the atmosphere.

PHOSPHATIC MANURES.

Phosphatic manures, e.g., bone-meal, bone-ashes, dissolved bones, superphosphate of lime, apatite, etc. This class of manures possesses the following special properties:—

1. They tend to make the fruits and roots sweeter.
2. They tend to increase the flowering and fruiting tendencies of plants, and also increase the absolute yield of seed and roots.
3. They make ripening of crops to take place earlier.
4. Young plants can resist the attack of insect and fungus pests better, i.e., they have more vitality in them if they are grown on soil manured with phosphates.

As phosphatic fertilisers are not very soluble in water it is necessary that most of them should be very finely ground.

MINERAL PHOSPHATES.

Phosphates occur in soil and rocks chiefly in the form of apatite. As a rule, crystals of apatite occur in microscopic dimensions, but occasionally rich deposits of apatite crystals, several inches in length and 2 or 3 inches in diameter are come across. Such a deposit may be found in abundance in the district of Hazaribagh and is of considerable value to Indian agriculture. As this mineral is hard, it must be employed in the crushed state either by means of disintegrator or by means of dhenki provided with a block of granite at the base of the mortar. In pure state, apatite contains 90 to 92 per cent. of tricalcic phosphate.

Occasionally phosphates occur in rocks and soils in the form of phosphorite crystals without being contained with calcium chloride or fluoride.

Weavilite, which is hydrated aluminium phosphate, is another fairly common mineral, but we can ignore consideration of this for manurial purposes, as it has not been discovered in abundant quantity anywhere.

In the Nepal valley there is a kind of clay rich in phosphatic mineral. It can be used as manure.

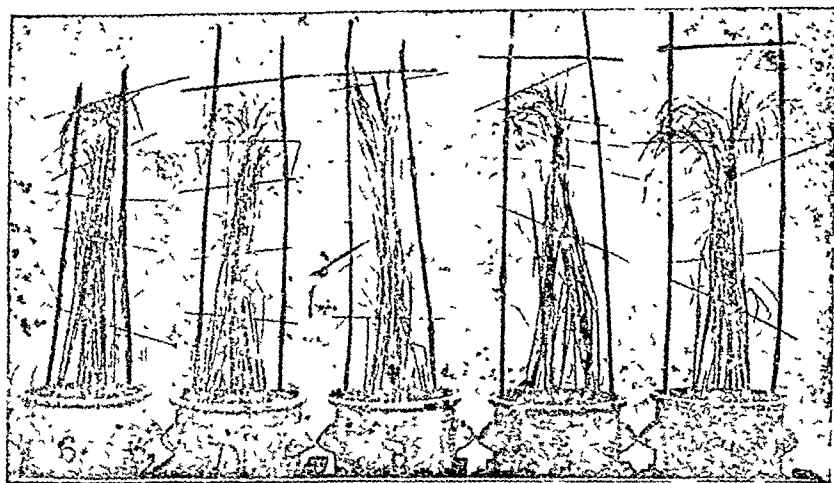
Hard phosphatic nodules occur in fair abundance at Trichinopoly. These contain nearly 23 per cent. of phosphorus pentoxide and $12\frac{1}{2}$ per cent. of calcium carbonate. These nodules are very hard and as they contain much iron and albumina, they involve much waste of sulphuric acid converting it into superphosphate.

Nearly all the mineral phosphates actually mined are used for the manufacture of superphosphate. The mineral phosphate, having been finely ground, is treated with sulphuric acid, and is run into a den where the reaction is completed.

A particular type of fertiliser which proved useful is called basic superphosphate and lime. It is very dry and fine and easily distributed.

SUPERPHOSPHATE OF LIME.

Superphosphate is the name given to a soluble phosphate and can be prepared by treating insoluble rock or bone phosphate, with sulphuric acid. By the action of the acid, the insoluble tricalcium phosphate is converted into monocalcium phosphate, while in many cases some free



Paddy Growing with Phosphates.

phosphoric acid is also formed. To prepare it on a large scale reduce the bone ash or phosphate rock to fine powder in a ball mill and put in a cast-iron vessel provided with a stirring arrangement. Now pour the two-third of its weight of sulphuric acid of sp. gr. 1.6 and incorporate thoroughly. Now transfer the slimy mass into a brick lined pit, where the reactions take place. The temperature rises to 110°C and much fume escapes. As the reactions progress, the charge stiffens and finally solidifies into a porous dry mass. In this way transfer several charges from the mixer into the pit until it is filled and then leave the whole for some days for the reactions to complete. After this dig out the product, pulverise it in a disintegrator and pack in bags.

The modern method of manufacture of this valuable substance comprises three principal operations: (1) Grinding the raw materials; (2) rendering the ground raw phosphate solution in sul-

phuric acid; (3) the drying of the superphosphate.

Raw phosphate should be carefully ground by means of ballmills, runners or flatstone mills; because it is found that the fineness of the phosphate contributes to a great extent to a perfectly successful superphosphate. Thus the powder should not leave more than 10 per cent. of residue on a 70 mesh sieve, and this residue should not exceed the size of groats; it is only at this cost that all the phosphoric acid is rendered soluble. The ground material is then put into a mixing machine. It consists of an egg shaped cast iron pan 64 inches wide at the top and 48 inches wide at the bottom, fitted with two discharge doors, with lever and counterpoise, which enables the mixing to be run into an enclosed space, called the decomposition chamber sunk in the ground. In the pan a vertical shaft turns, driven by a cog-wheel gearing and carrying blades of a special form arranged in a helicoid manner; these lift

throw down, and triturate the mass and prevent it at the same time from being deposited and attached to the sides. It suffices to pull the bent levers to open the discharge doors and thus let the liquid fall into the decomposition chamber.

Now to render the ground raw phosphate soluble in sulphuric acid, the material is put into the mixer and the required amount of cold sulphuric acid of density between 50° and 55°Be. The machine is started at once. When proper mixing has been obtained, the mass is thrown down to the decomposition chamber by opening the doors.

Owing to the gas given off, the thick liquid effervesces; at the same time it heats up to 248° to 302°F. Gradually it settles in the den, and after an hour it sets. An addition of dolomite keeps it liquid for some time longer, so that the water evaporated is then much greater.

All the heat given off by the reaction ought to be utilised with that end in view, that is, carrying off the water. It is only when this is done that perfect solution is realised, and that a superphosphate that will behave well on subsequent manipulations is obtained.

BONES.

The bone fertilisers are usually considered as phosphatic fertilisers only, and in the case of steamed bone flour, with a low nitrogen content, rightly so, but bones themselves, and the meal obtained from them, often contain sufficient nitrogen to have some value as nitrogenous fertilisers, as well as phosphatic ones.

In early days bones were used after being ground only; but owing to the

presence of fat in them they delayed their decomposition in the soil. They are now seldom used in the raw state, but are usually steamed to extract fat, or solvent extracted, or are boiled under pressure to extract the greater part of their gelatinous matter.

Therefore the bones to be used as fertilisers are first sorted and crushed to about 1 inch pieces. They are then extracted with hot solvent, often benzine, to take out the fat, and remove some water. The fat and water are run off. Another useful process is to treat the bones with dilute sulphuric acid. This is then boiled with the admission of steam when the fat and gelatine are removed. The bones after treating in either ways are easily ground very finely. The former method produces bone meal while the latter gives rise to what is known in trade as dissolved bones.

BONE MEAL.

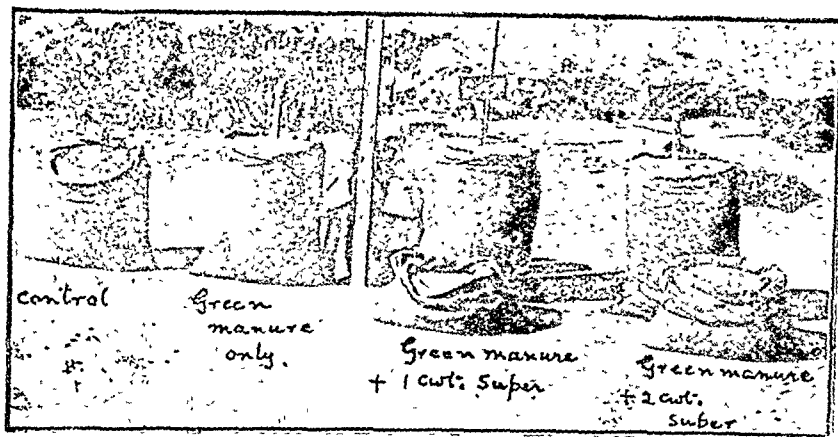
Those bones which have been merely de-greased are still rich in organic matter and are generally marketed as a coarse meal containing about 35 per cent. of organic matter with a nitrogen content of 3.5-4.5 per cent and calcium phosphate amounting to 45-50 per cent.

Bone meal has been found useful in the place of superphosphate for potatoes, and has given good results with these and other crops. It is safer, but not usually so effective as superphosphate for turnips, or basic slag for grass.

Bone meal usually acts best on a soil rich in humus or lacking in lime. It is not so satisfactory on calcareous soils.

DISSOLVED BONES.

These are bones which have been treated with sulphuric acid to obtain the



Green Manuring Rice.

phosphate in a more soluble form. They are de-greased and finely crushed, and mixed with sufficient sulphuric acid to dissolve about half the phosphate. After the reaction, the water is driven off by drying. A good dissolved bone should contain 2.5-3.5 per cent. of nitrogen, 15-17 per cent. insoluble phosphate.

BONE ASH.

In this article all the organic matter has been destroyed, and it is high in its content of tricalcium phosphate, normally containing from 73-75 per cent. of this substance.

BONE BLACK.

Calcined bones are used by sugar refiners to decolourise sugar juices. The bone black consists of about 10 per cent. finely divided carbon mixed with mineral constituents of bone, and often contains from 75-80 per cent. of calcium phosphate. It is made by heating bones in closed retorts.

After its use in sugar refining, the material can be used as fertiliser. It contains small amounts of nitrogen,

usually from 1.5-2 per cent. and is rich in phosphoric acid, containing 30-35 per cent. phosphorous pentoxide equivalent to 65-76 per cent. of tricalcium phosphate.

BONE SUPER PHOSPHATE.

By treating bones with sulphuric acid the calcium phosphate is converted into a soluble form so that growing crops may take up the phosphoric acid immediately. Dissolved bones not only contain soluble but also insoluble phosphates. These insoluble phosphates decompose gradually in the soil, afford a constant supply of nourishment to plants during growth, and are therefore of great importance to the farmer. Dissolved bones are useful for fast crops. They supply the land with phosphoric acid and nitrogen.

CRUSHING BONES WITHOUT MILL.

Bones, in country places, where mills are not available, may be reduced to powder by means of caustic lye (soda made out of ashes), quicklime or freshly calcined wood ashes. A simple plan is to pack the bones layer by layer, with freshly calcined wood ashes, in a ba-

and keep the mixture moistened for several months.

A quicker method is to boil the bones in an iron boiler with strong caustic lye. The proportion of bones and lye to be used is roughly 15 parts by weight of bones to 5 parts by weight of caustic soda or 7 parts by weight of caustic potash dissolved in 15 parts by weight of water. The boiling should be done for 2 or 3 hours. But even without boiling the bones would be disintegrated, being simply kept in the caustic liquor for about a week.

Another method of softening bones is by mixing them in heaps with quicklime and loam. A layer of loam 4 inches deep is first spread, and on this is put a layer of bones 6 inches deep and above this a layer of quicklime, 3 inches deep. The layers of loam, bones and quicklime are repeated until the heap reaches a convenient height, when it is covered all over with a thick layer of earth. Holes are then bored in the heap from the top and water poured down them to slake the lime. The mass will become hot and remain so for 2 or 3 months, after which, the bones will become friable, and the whole heap may then be mixed up and spread as manure on land.

GUANOS.

Guano is derived from the Peruvian word huana or dung and it consists of the consolidated excrementation matters of fowls, pigeons, bats and sea-fowl. Guanoses are only found to any great extent in those localities where rainfall is practically nil. Besides Peru, guanoses are obtained from many other countries, namely Chile, Bolivia, Patagonia, Texas, Cuba, Australia and others.

Guano is a very complex substance, but its chief value for agricultural purposes lies in the fact that it contains a considerable quantity of phosphate of lime and nitrogenous substance. The chief ingredients of guano are calcium phosphate, calcium carbonate, guanil, alkaline salts, etc. As such guano is the most important of all the artificial fertilisers of the soil. It has a special value in protecting sugar-cane cutting from being attacked by white ants and is also regarded as one of the best manures for wheat, 2 to 3 cwt. an acre being sufficient. It acts rapidly and is expended almost entirely on the crop to which it is applied.

The guanoses of commerce may be divided into those whose value is chiefly due to the nitrogen and those whose is chiefly due to the phosphorus.

BASIC SLAG.

It has been found within recent years that the phosphatic slag from the basic process of steel-making possesses considerable value as a fertiliser. The content of phosphoric acid varies from 10 to 25 per cent., and, according to some, the phosphoric acid exists as calcium phosphate. The slag is, however, of little value as a manure unless it be very finely ground—e.g., 80 per cent. of it should pass a sieve having 100 meshes for liner inch. The attainment of this condition constitutes the preparation of the slag for the market, and is expensive on account of hardness of the material. Grinding is commonly performed by a ball mill which consists essentially of a drum, the inner surface of which is polygonal; the drum contains a number of cast-steel balls of various sizes. Rotation of the drum breaks up the slag by the rolling

and percussive action of the balls, and the comminuted material is systematically separated by sieves in the sides of the drum. The sieves which effect the final separation are protected from direct contact with the balls by perforated iron plate.

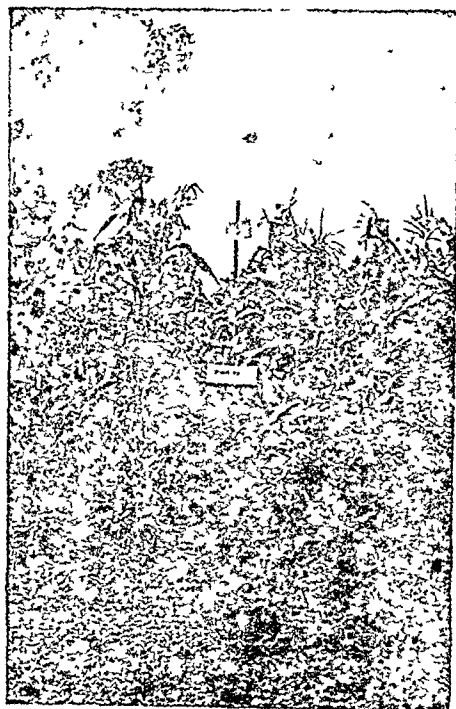
NITROGENOUS MANURES

Nitrogen is the most important of all plant foods, and the use of nitrogenous fertilisers usually gives the most profitable results. The principal nitrogenous manures are saltpetre, sulphate of ammonia, sodium nitrate, calcium cyanamide, blood, flesh, hair, horns, hoofs, soots, etc. The special value of this class of manures consists in their capacity for increasing the vegetative or leaf producing power of plants. Those crops that are valued for leaves only, such as cabbages, mulberry, tobacco, betel (pan), tea, etc., are benefited by nitrogenous manures. For all other crops, except leguminous crops, the application of nitrogenous manures at an early stage of growth after germination gives a good start.

SULPHATE OF AMMONIA.

Sulphate of ammonia is produced as a by-product in the destructive distillation of coal. The working up of gas liquor for ammonium sulphate is carried out in the following manner. The liquor is heated to drive off the free ammonia and the vapour is absorbed in sulphuric acid, forming ammonium sulphate, which crystallises and is periodically fished out. It is the common practice in some countries to use only that part of the ammonia which is liberated on distilling the gas liquor alone, but sometimes the fixed ammonia is liberated by the addition of lime.

In Germany, the sulphate of ammonia is produced by a special method by interaction with calcined gypsum and carbon dioxide. The ground calcined gypsum and water are put into a reaction column from the top and the ammonia gas and carbon dioxide are found together under pressure at the bottom. The liquid, after filling troughs in the column, flows over and falls to the bot-



Manuring Maize for More Oil.

tom in the form of a hot saturated solution with calcium carbonate suspended in it. The mass is cooled, and consists of ammonium sulphate crystals and calcium carbonate. The supernatant liquid is turned to the top of the column where more gypsum is added, and the ammonium sulphate is separated from the mixture.

using small amounts of water, filtering, and recrystallising.

SODIUM NITRATE.

Sodium nitrate is one the most common substances among fertilising materials. It is obtained from the deposits of crude nitrate known as Caliche in Chili and Peru. The Caliche is broken in a stone breaker, and systematically lixiviated in tanks heated by closed steam. When the liquid reaches a specific gravity of 1.55, it is run into crystallising tanks, in which it remains from four to six days; the mother liquor is then run off, and used for the recovery of iodine. The crystallised salt contains 95 per cent. of sodium nitrate, with small amounts of sodium chloride, sodium sulphate, magnesium sulphate.

CALCIUM NITRATE.

This material, also known as Norwegian saltpetre, is a product of the Norwegian nitrogen fixation industry. The method consists in sucking air into a furnace chamber containing a flaming arc produced between copper tubes cooled by water circulation, at a temperature of 3000-3500°C. The gases produced contain from 1.5-2 per cent. nitric oxide. They are cooled when nitric oxide is converted into nitrogen peroxide. The gases consisting of about 2 per cent. of nitrogen peroxide and a little nitric acid are passed through the absorption towers where nitric acid and some peroxide are absorbed by water. Nitric and nitrous acids are formed, and eventually nitric acid. The gas is afterwards passed through a 2 per cent. caustic soda solution to absorb any remaining acid. About 10 per cent. only

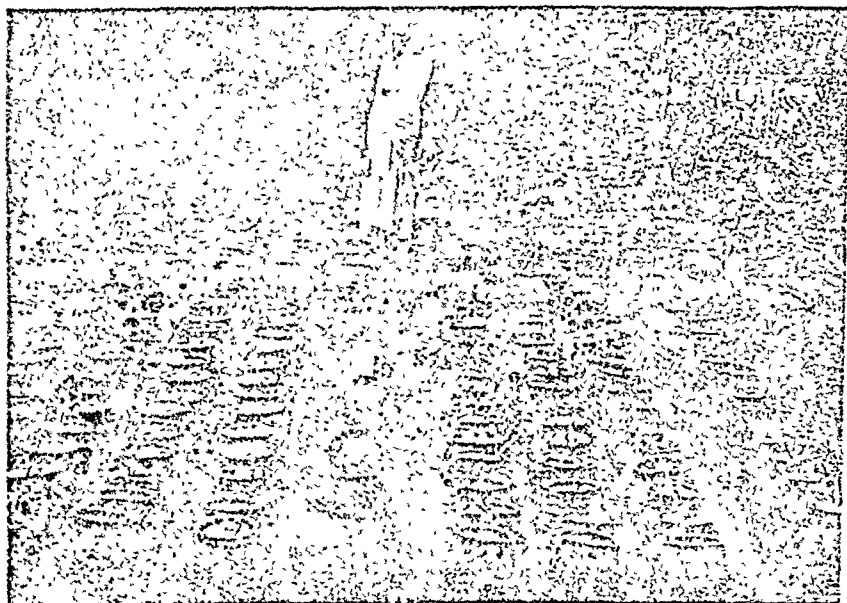
of nitric oxide and nitrogen peroxide remain in the gas before passing it into the alkali. The dilute acid solution is concentrated, and treated with limestone and the liquid evaporated until its specific gravity is 1.9, when it is run on to shallow trays. It is then ground up as a coarse powder, which usually consists of a basic nitrate containing about 75 per cent. of calcium nitrate, and gives approximately 13 per cent. of nitrogen. Its chief fault in its present form is its extreme deliquescence, which makes it necessary to sow it directly from the airtight drums in which it is stored.

CALCIUM CYANAMIDE.

Calcium cyanamide is also a fertiliser made from the nitrogen of atmospheric air; which is passed through coarsely ground heated calcium carbide. The calcium carbide produced by lime and coke in the electric furnace is made to combine with nitrogen obtained from air, and containing only very small quantities of oxygen. This takes place at a temperature of about 1200°C. The crude product contains calcium cyanamide and graphite, and is known as nitrolim. Its nitrogen content is usually from 17-20 per cent. When treated with water to remove unchanged carbide, it is known as cyanamide, and is used as a fertiliser.

POTASH MANURE.

Potash occurs in nature in felspar and mica, which enter into the composition of every soil. The pink coloured orthoclase felspar, which is so common in Indian granites, is richest in potash. In felspars, potash is contained in a more soluble than in mica, and its solubility is enhanced by admixture of lime.



Cane Seedlings with Culture Solution.

The presence of potash in the soil increases the availability of phosphate, and it is also intimately connected with assimilation of carbon by the green leaves and stems of plants, and the production of starch and sugar is stimulated by the action of potash. It appears that it must be in the soil to a considerable extent before it can be assimilated by the plant, and therefore, there is little danger of adding too much.

Potash especially improves the size and weight of roots, seeds, and fruits, and is essential in the cultivation of sugar producing plants, especially potatoes, tomatoes, and sugar beet. It is important in barley cultivation.

It stiffens the straw of cereal crops, and imparts vigour to plants, helping them to resist disease and bad weather. Leguminous crops and grass land benefit by the application of potash. With potash—
Vol. XXVI. No. 309.

atoes suffering from leaf roll, the disease is minimised by the use of potash, and an increase of potash sometimes diminishes potato scale.

POTASH SALTS.

Originally all potash salts for the production of fertilisers came from the Strassfurt deposits in Germany, but more recently, natural deposits in Alsace, Spain, America and Poland have been investigated. The natural potash deposits contain sylvinite, kainit, carnallite, potassium chloride, and schoenite. The crude salts of commerce are obtained from these deposits, and fertilisers containing 20, 30 or 40 per cent potash are made or blended; but generally purified salts are first prepared in the manner described below:—

POTASSIUM CHLORIDE.

Potassium chloride is usually obtained from sylvine by cooling a saturat

solution of the above substances, when potassium chloride crystallises out. In preparing potassium chloride from crude carnallite, the material is dissolved rapidly in water, clarified, and crystallised. The product is then washed at a low temperature to finally obtain a salt containing 80-98 per cent. chloride.

POTASSIUM SULPHATE.

The sulphate is generally made from kainit, or by acting upon potassium chloride with sulphuric acid.

A saturated solution of kainit is allowed to crystallise, when potassium magnesium sulphate comes out of solution, or a mixture of kainit and sylvinit is treated with a hot solution of kainit and cooled to produce the same salt.

To produce potassium sulphate from the salt, a hot saturated solution of it is run on to dry powdered potassium chloride, when potassium sulphate is produced in crystals, and separated at a low temperature in a centrifuge.

POTASH FROM SPENT MOLASSES LIQUOR.

The spent liquor is burnt after it has been concentrated, to produce a charcoal. The waste charcoal contains 8 per cent. and over of potash, generally as carbonate, and is suitable for use as a fertiliser.

POTASH FROM FELSPAR.

The felspar is finely crushed, beaten up with water, then run into a wooden vat placed in a large receiver of any material. The outside receiver is then filled; the inside receiver is then connected with the positive pole and the outside receiver with the negative pole of an electric current. This partially liberates the potash, the soda and other soluble

bases freeing them from the compounds which they form with silica. The soluble bases traverse the wooden wall of the interior vessel and pass into the water of the exterior vessel which they render alkaline. However, the felspar soon ceases to decompose. To render the decomposition more rapid and more permanent the mass in the interior vessel is continually stirred or hydrofluoric acid added.

WOOD ASHES.

The commonest potash manure is ashes of all kinds. The ashes of hedge trimmings contain upto 10 per cent. of potash. The ashes of young wood have a potash content as high as 25 per cent potash. Sunflower ash obtained from burnt leaves, stalks, and heads contains 20.9 per cent. of potash; while maize coles ashes may produce 36.3 per cent. of potash. Water hyacinth also contains potash salts and its ashes may therefore be utilised in fertilising the soil.

The potash in these ashes is in a highly available form mainly as carbonate, and should not be allowed to remain in the open, for rain will wash out most of the potash. The ash also tends to absorb moisture from the air, and should either be used immediately or mixed with superphosphate.

POTASSIUM CARBONATE.

Impure or crude pearl ash is mainly prepared by lixiviating wood ashes, and evaporating the solution to dryness. The mass is then transferred into iron pots, and kept in a state of fusion for several hours, until it becomes quiescent, when the heat is withdrawn, and the whole is left to cool. It is next broken up and

packed in air-tight barrels, and in this state, mixed as it is with much potassium chloride and some sulphate, it constitutes the potashes or potash of commerce.

In order to obtain much purer product the raw potash, 10 parts, is dissolved in cold water, 6 parts, and the solution allowed to remain for 24 hours in a cool place; it is then filtered, and somewhat concentrated by evaporation, crystallisation being prevented by continually stirring the mass until the whole is nearly cold; it is next decanted into a strainer, and the mother liquor allowed to drip off; the residuum is evaporated to dryness at a gentle heat, and redissolved in an equal quantity of cold distilled water; the new solution, after filtration, is again evaporated to dryness. The product is quite free from potassium sulphate, and is nearly free from potassium chloride and any silicates that may be present.

BANANA REFUSE.

The stems of the plant contain a considerable amount of potash and the ash of them can provide a suitable source of this fertiliser.

POTASSIUM NITRATE OR SALTPETRE.

Potassium nitrate is the best nitrogenous manure to use. Moreover in addition to nitrogen it contains potassium, a valuable plant-food, this substance can be used for the double purposes. Another special advantage is that it is manufactured largely in Bihar and to a certain extent in several districts of the United Provinces, the Punjab, Bombay, Madras and Burma. The climate best suited for the production of nitre is where dry weather follows the rains and thus by evaporation allows the salt to effloresce on the surface.

The manufacture in Bihar is in the hands of Nuniahs. They make piles of loose earth after the rains are over and build mud walls round them, that the previous stuff may not be washed away. This earth is obtained by scraping off an inch or two of the bed chosen and made into conical heaps 2 to 4 feet high, when a large number of these heaps have been collected, the impure saltpetre earth is lixiviated in earthenware dishes or wooden boxes or in pits dug in the ground and made tight by a clay puddle. The liquor is concentrated in iron pots or sometimes only by solar heat and a crop of very crude saltpetre is obtained.

MINERAL MANURES.

Mineral manures, e.g., lime, gypsum, shells, kankar, snails, etc.

This class of manures is best suited for leguminous crops, their chief function being to make the other constituents of soils readily available. Like phosphorous and potash, lime also increases the flowering and fruiting tendencies of plants. Whenever therefore it is noticed that plants or trees are vigorous in producing leaves, but backward or reluctant in putting forth flowers and fruits, the application of lime, ashes, and bones should be at once resorted to.

LIME.

Lime may be administered in any of the following forms:—

1. Carbonate of lime. It naturally occurs as chalk, corals, marls, etc.

2. Sulphate of lime. Sulphate of lime occurs naturally as gypsum. Fertiliser of paris is obtained by burning gypsum. Its manurial value depends upon the lime and the sulphuric acid it contains.

SODIUM SULPHATE.

Sodium sulphate is itself a good manure; but it is generally used with lime. It is also often used as an ingredient in compound manures.

SULPHATE OF MAGNESIA.

Magnesium sulphate enters as an ingredient in the preparation of certain special type of manures.

Among other chemicals common salt, washing soda, silica, etc., are sometimes applied as manure or dressings in special cases.

FERROUS SULPHATE.

Ferrous sulphate is employed as a manure in vegetable and flower growing and as a dressing. Ferrous sulphate also possesses antiseptic and germicidal properties. Ferrous sulphate is not a stimulant but a direct as well as an indirect plant-food. But it should be used in moderate quantities only.

COMPOUND MANURES.

The manures generally used or admixture with superphosphates are guano, bone dust, sulphate of ammonia and nitrate of soda. But as the guano now shipped from places of production is much less rich in nitrogen than that imported in the past, its place is taken by sulphate of ammonia, ground horn, dried blood, dried meat, etc. Superphosphate of potash is also prepared. The mixing is done as much as possible after the phosphate is dissolved. Mixing is not done in the dry state, except when it cannot be done otherwise.

TEXTURE OF SOILS INFLUENCED BY FERTILIZERS.

There appears to be a large number of substances, and among them many of the chemical fertilizers, which have an appreciable influence in altering the tex-

ture of the soil, making it more or less open and friable. Among them which have the power of flocculating colloidal, clay, lime has been most generally recognised, and it appears that this may be applied to the soil either as the oxide, hydrate or carbonate, with the same ultimate effect, though perhaps with varying rates of action.

Either directly or indirectly, fertilisers exert an influence upon the relation of water to the soil, as, indeed, has been implied in what has been said regarding their power to make the texture of the soil finer or coarser.

When fertilisers are applied, the soil may reach upon them either chemically or physically, and in such a manner as often to wholly prevent or greatly diminish their loss in drainage waters at times when percolation is taking place. Therefore, it is better to spread the manure over a large area in the right amount than to concentrate it in heavy dressings in small areas.

JUDICIOUS USE OF FERTILIZERS.

In order to make the best use of commercial fertilizers, both the soils and the crop must be carefully considered. All soils do not alike respond to commercial fertilizers, and farm crops possess different powers of assimilating food; turnips, for example, have very restricted power of phosphate assimilation, hence they do not require phosphate manures and wheat may need help in obtaining its nitrogen. A wheat crop will starve for want of nitrogen, while an adjoining corn will scarcely feel its need. Wheat has strong power of assimilating potash, while clover has less. Hence in the use of fertilizers the ability of the plant to

obtain its food must be considered. A light application of either a special preparation or a complete fertiliser at the time of seeding is often advantageous, as it encourages plant growth by supplying food when it is most needed. There should be some at this time in a highly available condition for the use of the young plants, after the food stored up in the seed has been exhausted, and before they are strong enough to make available their food.

Commercial fertilizers may assist in promoting desirable bacterial changes in soils resulting in the elaboration plant food. Before they are used, however, careful field trials should be made.

MANURING FRUIT TREES.

In the manuring of fruit trees, the first object is to produce thrifty trees, as subsequent fertilising for fruit will not give satisfactory results with poorly grown and partially developed trees. In order to promote growth, a liberal supply of a complete fertiliser should be used, and the soil should be kept in the best mechanical condition. When an orchard is in full bearing, there is as heavy a draft upon the soil as when a wheat crop is grown. To meet this, farm manures and commercial fertilizers should be used liberally. The productive period of an orchard is materially lengthened by judicious use of fertilizers. The quality of the fruit is often adversely affected by a scanty supply of plant food. A quick acting fertilizer, containing kainit, nitrate of soda, and dissolved phosphate rock, should be used in the spring, followed if necessary by a light dressing of some manure which yields up its fertility more slowly. An excess of nitrogen, however,

should be avoided. Stone fruits are benefitted by the addition of lime to the fertilizer. Lime fertilizers impart hardness to fruit trees.

VEGETABLES AND MANURES

Manure is of value as a source of humus, as a carrier of nitrogen, phosphorous and potash and as a promoter of useful organisms. Vegetable growers would not be justified in buying manure for its nutrient value alone under most conditions. The elements, nitrogen, phosphorous and potash can be bought more cheaply in chemical fertilisers than in manure when the cost of handling and applying are taken into consideration. Manure, however, is the most valuable source of humus available and some form of organic matter is necessary to keep the soil in good condition. Manure improves clay soils by making them looser and more friable, thus improving drainage and aeration. It improves sandy soils by filling spaces between the soil particles with humus and therefore makes them more retentive of moisture. By heavy applications of manure to sandy soils vegetable growers are able to produce good crops which would be impossible without manure or some other source of humus.

VALUE OF MANURE.

As a carrier of nitrogen, phosphorous and potash the value of the manure depends, (1) upon the kind of manure, (2) the amount and kind of bedding or other material mixed with it and (3) the care the manure has had before being applied to the land.

FRESH MANURE VS. ROTTED MA.

Among the advantages of using manure while it is fresh are —(1) That

is little loss of valuable materials through leaching and decomposition, (2) some insoluble materials in the soil are made soluble by the decomposing manure coming into contact with the soil particles. (3) desirable organisms are supplied in the fresh manure, (4) the texture of heavy soils is improved, and (5) the growth of foliage is favoured and therefore the yield of crops grown for their stems and leaves is increased. Among the disadvantages of fresh manure might be mentioned: (1) unfavourable effects on the soil when applied in large quantities; (2) burning effects on plants, due to rapid decomposition of urine in manure, especially in open porous soils; (3) carries weed seeds and germs of plant diseases.

Decomposed manure contains phosphorus and potassium in more available forms and in large percentage than in fresh manure. The larger percentages are due to the fact that the organic matter has been reduced in amount by decomposition. The nitrogen in decomposed manure is not as readily available as that in the urine of fresh manure. Some of the advantages of decomposed manure are: (1) More even action and more evenly balanced combination of nitrogen, phosphorus and potash, (2) less likelihood to cause burning, (2) smaller bulk to handle for same amount of fertilising materials, (4) weed seeds largely destroyed during decomposition and (5) less interference with soil preparation and cultivation.

TIME TO APPLY.

The proper time to apply manure depends on the kind and age of the manure, the stage of its decomposition,

the crops to be grown, and the rotations to be followed. When cow manure is to be applied it should be ploughed under as far in advance of planting as convenience.

AMOUNT AND METHOD.

The rate of application depends upon the supply of manure, the kinds of crops to be grown and the character and richness of the soil.

CARE OF MANURE.

The liability of manure to a rapid loss of its constituents makes proper care and handling of the material an extremely important consideration. The richer the original manure is in nitrogen, phosphorus and potassium, the greater is the liability to loss. This tendency is due to the more rapid fermentation of a substance rich in nitrogenous material and to the greater possibility of loss from leaching in substances containing large amounts of soluble mineral salts.

For crop purposes the elements of the soil may be divided into three classes.

STORING MANURE.

The two fundamental requirements for the proper care of manure are to prevent leaching and to minimise the loss of nitrogen from fermentation. These two ends are best obtained by storing the manure in covered sheds with tight bottoms and keeping it carefully spread and moistened. Where covered sheds with tight bottoms can be provided for live stock, the loss in manure can be reduced to a minimum. Leaching is prevented by the roof and tight floor; the trampling of the animals keeps the manure compact and the urine furnishes moisture which reduces fermentation.

SYSTEM OF MANURING CROP.

The following hints on manures appropriate to each of the staple crops is

intended to supply the farmer, not with a series of recipes or patent mixtures that are universally applicable, but with principles appropriate to his own farm.

RICE.

Paddy is often grown with manure. It is also largely grown without manure on river sides where there is silt deposit. The manures used are cowdung, ashes, tank-earth, and, rarely, oil-cake. Aus crop grown after potatoes is not manured 250 lbs (1 maund per bigha) of oil cake per acre is the usual quantity used, when this manure is applied. Tank earth is applied once in 3 or 4 years, 30 to 100 cartloads per acre; 80 lbs. of bone-dust and 80 lbs. of saltpetre per acre would be a good substitute for oil-cake, and would give more yield. The bone-dust should be applied at the time of cultivation, and the saltpetre a fortnight after transplanting, mixed up thoroughly with the earth along the lines of transplanting.

JUTE.

Where there is silt deposit no manuring is required. Elsewhere cowdung at the rate of 150 maunds per acre may be applied where necessary. All fire crops are appreciably benefited by cowdung manure, except those belonging to the leguminous order.

CABBAGES & CAULIFLOWERS, ETC.

Cabbages are specially benefitted by saltpetre at 10 mds. per acre; cauliflower by mustard cake and lime or ashes at 10 mds. and 5 mds. respectively per acre; but turnips and knolkohl are especially benefited by bone-super at 6 mds. per acre accompanied by heavy manuring with farm-yard manure. Carrots and radishes prefer cowdung at 200 mds. per acre, and

tomatoes are specially benefited by cowdung ashes

PULSES.

The general recuperative effect of pulse crops on soils should be remembered. Lime and ashes are the best manure for pulse crops, and cowdung and other organic manures, the worst.

WHEAT.

Speaking generally on soils in good heart wheat will rarely require manuring; at any rate, it will be wise to wait for the seedlings, and then if the plant appears to be growing badly or losing ground a top dressing of nitrate of soda (1 to 1½ cwt per acre.) sulphate of ammonia (1 cwt. per acre), or soot (20 bushels per acre) will do all that is needful. Soot has for some centuries been employed as a spring top dressing for wheat; besides the nitrogen it supplies, it also tends to preserve the plant from the attacks of insects. The ground may be further enriched by spreading a coating of dung (10 tons per acre) on the clover before ploughing.

Of course when wheat and other cereals are grown continuously on the same land, it is necessary to employ a more complete fertiliser—2 cwts. per acre of nitrate of soda or sulphate of ammonia will be required as a spring top-dressing, and 3 cwts. of superphosphate or 2 cwts. of basic slag, according to the amount of calcium carbonate in the soil should be sown before the seed. Potash would only be necessary on the lighter soils, on which wheat is not likely to be grown continuously, but in such a case 3 cwt or so per acre of kainit would be desirable. Fertilisers for wheat may be crude salts, like nitrate of soda or superphos

phate; the establishment of a plant is little affected by the amount of humus in the soil and the extra price of organic manures like the guanos will rarely be rapid by an increased yield.

BARLEY.

In preparing for a crop of barley of high quality it is necessary not to allow the land to become really poor, but it is desirable that the nitrogen should come more from condition in the land than from very active manures. If the land is in really high condition before the first straw crop of wheat or oat is taken, barley may follow without any fertiliser, especially if the ground can be got into good tilt and the barley sown really early. The following mixture is however recommended for a barley manure, when barley follows one or more white straw crops and the land is no longer in high condition:—

Sulphate of ammonia $\frac{1}{2}$ to $1\frac{1}{2}$ cwts., or rape dust 4 to 6 cwts. per acre, superphosphate 3 cwts. per acre, or steamed bone flour 2 cwts.

Sulphate of potash $\frac{1}{2}$ cwt. per acre, on light soils only.

The superphosphate and sulphate of ammonia or rape dust should be mixed and sown broad-cast before the seed is drilled.

OATS.

The general principles of manuring for barley hold also for oats, except that, being grown for feeding purposes only, they can be given much larger quantities of nitrogen without any fear of injuring their quality. As an all-round fertiliser for oats when the land is in poor condition 1 to 2 cwts. of nitrate of soda or sul-

phate of ammonia and 2 cwts. of superphosphate or basic slag, according to the class of soil, will answer all the requirements of the oat crop.

MAIZE.

Maize requires the land to be brought into fairly high condition. A preliminary dressing of 12 to 15 loads of dung per acre should be given, with 2 to 3 cwts per acre of superphosphate at the time of sowing, then 1 cwt. per acre of nitrate of soda may be used as a top dressing round the plants when they are set out and side hoed.

ROOT CROPS.

A suitable mixture for swedes when no farmyard manure is available, will consist of 4 cwts. of superphosphate (or its equivalent in basic slag or steamed bone flour as before), 2 cwts. of fish or meat guano, and $\frac{1}{2}$ cwt. of a mixture of nitrate of soda, sulphate of ammonia as a top dressing when the plants are singled. If the land is in really good heart, the fish guano can be omitted or reduced. It will be seen that various compounds of nitrogen are used in order to ensure a steady and continuous supply of nitrate as long as the plant is growing.

Of the other crops allied to swedes, white turnips require much the same treatment, except that the fish guano may be omitted because they possess a shorter period of growth, while the potash is more necessary. Kohl rabi may have just the same treatment as swedes, with the addition of more nitrogen. Cabbages in particular will respond to enormous quantities of nitrogen. In addition to the farmyard manure or fish guano recommended for swedes, upto 3

cwt per acre of the mixture of nitrate of soda and sulphate of ammonia may be used in two or three top dressings.

POTATO.

It is somewhat difficult to lay down general rules for the manuring of the potato crop, so varied are the tilths upon which it is grown and so different are the yields that are aimed at. As regards the use of dung a better return is obtained by using farmyard manure in moderate quantities of 20 loads per acre or so and supplemented with artificial manures, than by using dung alone. The dung should be applied in the drills just before planting. The mixture of artificials should be either sown broadcast before the land is ridged up or sown upon the farmyard manure in the drills before the ridges are split. For ordinary cropping a mixture of 4 cwt per acre of superphosphate, 1 cwt of sulphate of potash and 1 cwt of sulphate of ammonia will be ample, when extra heavy crops are aimed at, 2 cwts or so of a good guano may be added to the mixture already specified and a further hundred weight of sulphate of ammonia may be applied as a top dressing when the haulm begin to appear.

THE LEGUMINOUS CROPS.

The leguminous plants are able to obtain nitrogen from the atmosphere by the agency of the bacteria in their nodules and can in this way satisfy their requirements for nitrogen. To obtain the biggest crops rich soil and certain nitrogenous manures are necessary, but to secure the greatest profit out of a leguminous crop, it should be left as far as possible to derive its nitrogen from the atmosphere. All leguminous plants

are particularly sensitive to any trace of acidity in the soil, so alkaline fertilisers like basic slag or nitrate of soda should be selected. Lime is also desirable both for its basic properties and as a liberator of insoluble potash in the soil, because all leguminous crops are specially dependent upon an abundant supply of potash.

TROPICAL CROPS.

It is very difficult to lay down any general rules for the manuring of tropical and subtropical crops. Certain general principles may, however, be indicated to be taken into account. It is always the crops of short duration on the land—tobacco, cotton and to a less extent sugar-cane—which most require manuring. really perennial crops like tea and coffee require much less manure and that of a more slowly acting kind. It is only the short period crops which will respond properly to active sources of nitrogen like nitrate of soda or sulphate of ammonia.

SUGAR-CANE

Before planting, a comparatively slow acting nitrogenous fertiliser should be used, either equivalent of farmyard manure or some seed residue like castor pomace to supply about 100 lbs. of nitrogen per acre. Excess of nitrogen must be avoided, as it induces late cane and an impure juice. On many soils applications of potash salts are very effective.

COTTON

Cotton responds freely to fertilisers, and there is evidence that the fertiliser should be a mixed one but mainly phosphatic. About 4 cwts per acre of superphosphate and 2 cwts. per acre of cotton seed meal or some equivalent organic source of nitrogen, should be ploughed in

before sowing and this may be followed up by a $\frac{1}{2}$ cwt. per acre of a more active nitrogenous fertiliser like sulphate of ammonia or nitrate of soda when the crop has begun to grow.

TOBACCO.

Before planting out the tobacco 200 to 300 lbs. of an organic nitrogen compound—cotton seed meal or castor pomace—200 lbs. of superphosphate and 100 lbs. of sulphate of potash should be applied, followed by 100 lbs. of nitrate of soda when the plant is growing; potash appears to be very essential, and may be given as nitrate, carbonate, or sulphate.

TEA.

The fertility of a tea garden as regards nitrogen can be maintained by carefully burying the lighter prunings and weeds. By also supplying basic slag at the rate of about 2 cwt. per acre the residues thus utilised are balanced by the phosphate. When manures are necessary it is best to employ slow acting substances like bone meal and castor pomace.

NATURE OF SOIL ACIDITY.

The nature of soil acidity is so little understood that it is impossible to define or explain it except in the most general terms. So called soil acidity may be considered for practical purposes as a more or less unfavourable condition for plant growth, arising in the soil through a lack of certain active bases such as calcium and magnesium and which in practice is alleviated by the addition of some form of lime.

Technically two reasons may be suggested as accounting for the harmful effects of soil acidity: (1) presence of substances harmful to plant growth such as active aluminium, manganese and the

like, and (2) in proper nutrition arising from a lack of calcium as a nutrient or as a synergistic agent in facilitating the entrance of other nutrient iron into the plant.

The correction of soil acidity obviously lies in the addition of compounds which carry the necessary bases in such forms that the acidity may be partially or wholly alleviated.

The base most commonly used to correct acidity is calcium, although magnesium is often applied, especially in connection with calcium. Calcium is employed because it is not only effective with all types of acidity but because it is comparatively cheap and plentiful. Potassium in active form is too expensive; sodium is likely to generate harmful compounds in the soil, while magnesium in large amounts is sometimes harmful. Calcium compounds may be applied in excess and yet no harmful effect in plant growth are ordinarily likely to result.

FORMS OF LIME.

The term lime, correctly used, refers only to calcium oxide. In a popular and agricultural sense the scope of the word has been broadened to include all of the commercial compounds of calcium and magnesium commonly applied to the soil to correct the so-called acidity. The term in its agricultural sense refers to the following compounds either alone or in a mixture—calcium oxide, magnesium oxide, calcium hydroxide, magnesium hydroxide, calcium carbonate, and magnesium carbonate. Such compounds as gypsum, mono-calcium phosphate, and calcium silicate, in so far as they are

carriers of calcium, also might be spoken of as lime.

As might be expected, liming materials do not appear on market as single compounds of magnesium or calcium, nor are they by any means pure. The better grades of the oxides and hydroxides are generally used in the trades, the more impure materials having an outlet as agricultural lime. The carbonated forms of lime have a number of different sources and vary to a marked degree in purity. Lime in whatever form it may appear on the market, almost carries magnesium as well as calcium, the latter usually predominating.

Three groups of lime as it is commercially handled may be recognized: (1) burnt lime, (2) water-slaked or simply slaked lime, and (3) carbonated lime.

CROPS RESPONSE TO LIMING.

There are a number of reasons why plants may be benefitted by lime, these reasons are numerous and complex enough to account for the differences in response among common crops. The possible influences of lime on plants may be listed as follows: (1) direct nutritive action; (2) synergistic relationships either in the soil solution or in the cell-wall; (3) removal or neutralisation of toxins of either an organic or inorganic nature; (4) effect on plant diseases; (5) liberation of mineral nutrients; and (6) encouragement of the biological preparation of nutrient materials.

METHOD OF APPLYING.

Lime is best applied to ploughed land and worked into the soil as the seed bed is prepared. It should be thoroughly mixed with the surface three to five inches of soil. Top-dressing of lime is

seldom recommended except on permanent meadows and pastures. The time of year at which lime is applied is immaterial, the system of farming, the type of rotation, and such considerations being the deciding factors. The soil should not be too moist when the application is made, as the lime tends to ball badly and thus thorough distribution is prevented.

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the knife-blade it lies flat. Then replace the knife in its loop under the cushion, and taking the tip pass it lightly over your hair, thus acquiring sufficient greasiness to enable the gold to stick to it. Lay the hairy portion of the tip upon the gold-leaf, and then raising it apply it to the sized surface. As in sizing, work from left to right, and be especially careful to let each leaf overlap slightly, so as to avoid gaps and spaces. Lay on whole leaves as far as the space permits, and then proceed to gild the curves and corners which need smaller pieces. Place a leaf flat and smooth on the cushion, and then taking the knife in the right hand draw the edge easily and evenly along it with a gentle pressure. Divide the leaf into as many pieces as required, and lay on as before. When all the ground is complete inspect it carefully to make sure there are no portions ungilt, however small, and mend them at once. Next take a piece of cotton-wool and gently dab or press the gold down all over, finally brushing off the superfluous pieces either with cotton-wool or a camel's hair brush. It is a good plan to stipple the gold with a large stiff hog-bristle tool, quite dry and clean, as this gradually softens and removes the marks of joining and other little imperfections. Finally smooth the gold with a clean piece of wash-leather, and it is completed. With regard to gilding with japanner's size the same instructions apply, except as to the time necessary to wait between sizing and gilding.

very clean and pure parchment size with 2 parts of water, and brush it over the entire surface of the gold to enrich and preserve it. If it is necessary to gild in a position much exposed to touch, as the base of a pillar or string-courses, it is as well to give the gold a coat of mastic varnish thinned with turpentine. There are various processes which tend to enrich and vary the effect of gilding. Glazings of transparent colours are sometimes applied for the purpose of deadening its lustre. Raw sienna passed thinly over a sheet of gold gives it a leathery appearance. A good effect may be produced by stencilling a small pattern in number sienna, or Indian red over gold, especially if there is foliage or arabesque work upon the gilding, as the small design affords an agreeable relief. This is the easiest mode of gilding; any other metallic leaves can be applied in a similar manner.

Ordering & Clearing Imports.

IN what quantities shall goods be ordered forward in the general execution of the import trade? Shall one cable for ample stocks, and risk heavy storage costs if sales slump, or order from hand to mouth, and risk annoying clients by serious delays in filling orders? These are crucial questions, hard to deal with except in general terms. There is the ordinary hazard of supply and demand. Importers must watch for signs of changed demand; they must closely follow harvest, weather, and financial conditions overseas, and note influences that may make production unduly cheap or abnormally costly. The world's fiscal policy is of interest to some, who must avoid being caught by tariff changes that may either penalize them or help their competitors.

CONSIDERATIONS WHILE ORDERING.

Much depends on the length of the voyage and the rapidity with which stock can be replenished. It also counts whether the goods are luxury goods bearing ample profits, whether they can be stocked in or near one's own premises, or whether dock or wharf storage is essential.

The only fundamental doctrine is to order the maximum possible, in any set of conditions, as one consignment. The troubles and costs of handling a dozen small lots are much more severe than of dealing with one large lot. There are economies in freight, bill of lading costs, agency and Customs charges, Consular fees, dock charges, cables, etc., when one 50-ton lot is handled instead of 50 one ton lots, provided, of course, there is a

prospect of selling the 50 tons in a few months and that the goods will not quickly deteriorate. Order forward liberally in the light of your knowledge of markets; don't think only of crippling rent charges. But do not emulate those firms who in 1919 lost all self-control and ordered enormous stocks just after the boom had passed its climax, and in consequence of dropping prices lost heavily. That way lies disaster!

BILL OF LADING.

Of the many documents handled by an importer, probably the most important is the bill of lading, and for two reasons. Not only is it a document of title establishing, if in order, the holder's claim to the goods it represents, but—equally important—it is the key to the legal position as between carrier and trader.

Usually the importer's first impulse on receiving a bill of lading is to get rid of it. This is quite good, but one should not be too hasty. A careful examination, noting that an original (signed) copy has arrived, and that the endorsements are in order, may save subsequent delay and expense. It is, perhaps, futile to counsel careful perusal of all the clauses and conditions of the document—life is too short—but special attention should be paid to any clauses added in writing or by means of rubber stamps, etc., and one should see whether marks and numbers agree with those advised.

The freight release, or ship's delivery order—invariable use of the former title prevents confusion—must be secured before goods can be collected. This entails payment of freight and, some-

times, surrender of the bill of lading. Here is a minor "snag." An importer who urgently wants goods may, in his desire to expedite matters, pay freight and secure a release before the vessel is docked. If, when the goods are landed, damage or shortage is disclosed, the importer who has given up his bill of lading in exchange for a ship's delivery order may find himself handicapped in claiming on the ship. By the time a duplicate bill of lading arrives the period for claiming may have passed. Hence the importance of prompt and careful inspection of documents.

SHORT-DISTANCE TRADE.

Importers of goods from the Empire, the Far East, or America usually get ample warning of consignments on the way. Often, in fact, the bill of lading itself arrives long before the ship. Traders handling Continental imports are not so fortunate. They are constantly in a state of unrest, wondering, while travelling to town each day, how many boats have crept up during the night, unadvised and unarranged for. Even if shipping advices have arrived, it is often impossible for bills of lading to reach traders much in advance of the carrying vessel's arrival. Often the boat itself carries the mails. In the desire for a quick turn round, too, such vessels usually begin discharge directly they arrive, without waiting for instructions from the various consignees.

Prompt action by importers is thus imperative. If a line has a regular quay berth, arrangements can be made that the dock or wharf staff will accept goods whenever they arrive, even if documents are not to hand. With craft deliveries,

however, special steps must be taken, and a partial solution is found in the provisional release. This document, on lodgment properly signed by the importer and the lighterman, covers the discharge of goods from ship to craft. The craft, however, must not leave the ship's side until the full release comes to hand.

MISHANDLING OF MERCHANDISE.

The provisional release helps both trader and shipowner, but, unhappily, lends itself to minor abuses. Shipping agents who regularly act for certain importers can, and do, by its agency, get possession of goods without troubling the consignee. Knowing the usual shipping marks, and getting an early glance at the manifest of a newly reported vessel, they get goods into craft without waiting for the bill of lading. This is often laudable energy, but some agents thus get hold of consignments for which they have no instructions, and inveigle the owners into leaving goods in their hands by presenting a *fait accompli* or submitting a heavy bill for payment before the goods will be handed over. Importers who find their goods so mishandled have their remedy. They should give such directions to the shipbroker as will prevent a repetition of the trouble.

CAPTAIN'S ENTRY CHARGES.

Akin to the last subject discussed is the problem of captain's entry charges. Shipowners have power, under their bill of lading, to begin unloading their vessel directly she arrives, and consignees are bound to take delivery of cargo at time, day or night, Sundays and holidays included, irrespective of weather, and as fast as the ship may require. Should consignees fail to apply for delivery,

not take goods fast enough, the shipowner can exercise his option to deliver the offending cargo to a craft specially hired, and termed a captain's entry craft.

In normal times the right is seldom exercised, but at times of pressure such crafts are often used. The shipowner is then entitled to make what arrangements he thinks best for the landing and storage of the goods, the cost being collected from the consignee when he applies for release. Such a plan is, on the face of it, equitable and natural, but at busy times there is a temptation to resort needlessly to captain's entry craft—as some importers discovered to their cost a few years ago. Incidentally some shipowners have since regretted the strong line they then took with their clients.

THROUGH BILLS OF LADING.

Importers of American goods are sometimes nonplussed by the arrival of a bill of lading not bearing a ship's name. This is probably a through bill of lading, covering goods throughout a rail trip from some interior point to the coast as well as serving to cover the sea voyage. Unless other advices have disclosed the name of the carrying vessel, the step which must be taken is to keep touch with the shipowner's inward freight department and examine the manifests of incoming vessels until the goods are located.

BILL OF LADING REFORM.

Importers are watching the move toward uniformity of contract in regard to carriage of goods by sea. Excellent progress is being made toward standardizing the degree of liability assumed by the shipowners, and The Hague Rules, 1921, as amended subsequently, being

now incorporated in British law, now apply to bills of lading issued by British lines. It is possible that other nations will follow suit, and the first stage in that particular problem will be solved.

BUSINESS OF INSURANCE BROKER.

INSURANCE broker is the middleman who negotiates between underwriters and the owners of vessels and shippers of goods whose property he insures. An insurance broker has a set of underwriters, who are his principals, and a constituency of owners and merchants, who are his customers, and who send him orders to insure for them. He meets with other brokers to settle the terms on which risks will be taken, and when he has a risk to cover for one of his customers he may perhaps put down his own underwriters for a portion of it, and give a portion of it to other brokers to be covered by their underwriters. In this way the risks are divided and each underwriter has a large number of small risks instead of a few great ones. The transactions of the broker are subject to the approval of the underwriters, who must sign the contract as principals; but he usually receives general instructions to act for them in a particular way and as long as he conforms to his instructions they sign as a matter of course. This understanding enables him to carry on his business systematically with his customers. He is paid by a percentage of the premiums. When a merchant insures goods through a broker the premium or price of the insurance may not be immediately paid; but if there is an established period of credit the insurance, notwithstanding this

is valid, and the policy or stamped engagement signed by the under-writers lies with the broker in trust for the insurer as a lien for payment of the premium. If the broker gives any credit to the insurers beyond the established custom he is himself liable to his principal for the payment of the premium, and it becomes a point of great legal nicety whether the policy is quite different from that either of an authorised agent, or of a sub-agent or canvasser of an insurance company.

MEANING OF QUOTATIONS.

IN inland and foreign trade we often come across with terms like c.i.f., f.o.b., etc. The meanings of these terms and the distribution of risks between the seller and the buyer should be carefully noted for on many occasions disputes arise due to misunderstanding of the same.

The symbol C.I.F., means cost, insurance and freight. In quoting prices on a "C.I.F." basis the manufacturer agrees to pay all charges involved in getting the goods on board the steamer, the marine insurance premium, and the freight. All other charges such as consul's fees, etc., not included in the "C.I.F." quotation, must be borne by the customer. In quoting C.I.F. the manufacturer should inform the customer as to the kind of marine insurance to be taken out, and in time of war whether it involves a war risk clause.

To the foreign customer a C.I.F. quotation is the most attractive. Knowing what goods will cost him at the port of destination he can easily calculate what the charges at the home port will amount

to. Knowing approximately what the total cost will be he can then quote a definite price to his customer without delay.

In quoting C.I.F. however, the shipper assumes the following risks:—

Loss from fluctuation of charges involved in placing goods on ship.

Loss from fluctuation of rates in marine insurance.

Loss from fluctuation of ocean freight rates.

On the otherhand, however, a sudden drop of freight or insurance rates may mean an increased profit to the shipper. As a matter of fact some exporters make their "C.I.F." quotations so close that they usually depend on the changing freight and insurance rates to drop in their favour. Their profits are obtained from the difference at which they booked the freight and marine insurance and the final price that was paid. In as much as there is considerable risk involved in quoting "C.I.F." prices it is necessary to limit such quotations to a certain time only, as a protection to the shipper. In order to expedite the closing of deals on a "C.I.F." basis the cable is usually resorted to, and an answer by the same method is generally requested. When quoting by mail on a "C.I.F." basis an immediate reply by letter or by cable is asked.

The shipper who quotes a "C.I.F." price is responsible for the following:—

Delivery to shipping point.

Delivery of goods on vessel and payment of freight charges and insurance premium.

It should be noted that the shipper is not responsible for the delivery

goods to destination. If the goods arrive in a damaged condition or are lost the customer must pay for them, nevertheless. He must obtain satisfaction from the carrier or the insurance company, but not the manufacturer.

In computing C.I.F. prices the manufacturer must know:

The approximate cost of a given weight of goods delivered on board the steamer at the port of shipment.

The cubic measurements and gross weights of packages.

The approximate ocean freight rate to be paid.

To make up the "C.I.F." cost of a certain shipment of goods the manufacturer must:

Compute the railroad freight, cartage, and other charges incurred in placing the goods on board the steamer.

Calculate the ocean freight that is to be paid.

Include the marine insurance.

If the shipment involves a hundred gross of a certain article it will not be difficult to quote a price per gross "C.I.F."

F. O. B. VESSEL (NAMED PORT).

Now that trade with the United States of America is gradually increasing it is significant to note that while the term F.O.B. in every country, except in America, means that the seller must deliver the goods on board the vessel, it is the general practice in America to specify such an obligation by adding the word "vessel." The term—F.O.B. has a significance in America corresponding to F.O.R. in Great Britain and "Franco sur Wagon" in most countries on the Continent of Europe.

Under a quotation "F.O.B. vessel" in the United States according to a bulletin of the International Chamber of Commerce

The Seller must:

1. Be responsible for the freight and transportation of the goods to the named port.

2. Be responsible for the loading of the goods on board the ship and cover the expenses of same.

3. Provide usual dock or ship's receipt.

4. Be responsible for all loss and for damage which may occur until the goods have been placed on board the vessel.

The Buyer must:

1. Charter ship or reserve space on board the vessel; designate vessel or steamship line to which delivery shall be made and where necessary, supply regular shipping permit. Buyers' indication of ship or steamship line must be made within reasonable time, in case seller has notified that goods are ready.

2. Be responsible for all loss and for damage which may occur from the time that the goods are placed on board the vessel.

3. Payment is a matter to be covered specifically by sales contract.

F. O. B. (NAMED POINT).

In the case of a quotation "F.O.B. named point."

The Seller must:—

1. Secure railroad facilities.
2. Place goods on or in cars.
3. Secure railroad bill of lading.

4. Be responsible for loss and for damage until goods have been placed in or on cars or lights at forwarding point and clean bill of lading has been furnished by the railroad company.

The buyer must:—

1. Be responsible for loss and damage incurred thereafter.
2. Pay all transportation charges from named point.
3. Unless provided otherwise, effect payment concurrently with the delivery of the goods.

It may be remarked in this connection that the acceptance takes place at the F. O. B. Point. The buyer is allowed reasonable time from that point.

IN THE INSURANCE FIELD

BY OUR INSURANCE COMMISSIONER.

On Selecting the Policy.

The large policyholder is generally confronted with a difficult problem whether to put all his eggs in one basket or to distribute them over different ones. The average policyholder of big amounts is found usually to have his protection arranged in several offices. This happens not only because he wants to assure his protection with a number of companies but also because the same company sometimes fails to offer all the different plants suitable for the insurer and demonstrated by the competitors of different companies. The policyholders however, forget one fundamental consideration. A sound insurance company is the strongest financial institution it is possible to find. On that account, provided the office has been intelligently selected, there is no reason why an individual should patronise more than one, even if his insurance is of a really large amount. The companies' investments are not all in one basket, but are spread; and if we have entrusted it with a large insurance the chances are that the whole of the risk is not carried by the one concern. But this is not the whole of the story. Taking into consideration, the differences which seem to be developing in the investment policies of some big offices the policyholder who spreads his life insurance over different companies has some definite advantages. For example, some of the companies of almost the same financial standing might be backing up investments in mortgages and stock-

exchange bonds, while the others may stick to the high priced gilt-edged securities. As it is not possible to enforce, legally or otherwise, strict rigidity in respect of the investment policy of a company, the policyholder gets the advantage of sharing in the experiences of both these types of life offices by putting his insurance with both instead of one. Although it is not possible to draw a distinction between the different life offices solely on account of their investment policies, it is a happy sign that in India the policyholders are interesting themselves in at least taking that important fact into consideration before taking out a policy. Much, however, depends in this respect upon the individual agent who serves the policyholder. The spirit of service, the continuance of the acquaintance, and the care taken to try to fit life policies to requirements and keep them so fitted by process of adjustment and additions as requirements alter, are much more potent factors in inducing the policyholder to patronise the older company than any other.

The Problem of "Experts."

The anxious policyholder who being desirous of making sure which kind and plan of insurance would be most suited to him, wants to take the counsel of experts. The result is often unsatisfactory, both for the policyholder and the experts, since these experts, who are generally organisers and inspectors of agents, each evolve a different kind

solution and plan for the requirements of the policyholder. Naturally, each wants to convince the buyer about the quality of the goods of his particular company. The policyholder is bewildered at the variety of solutions, and the insurance is more often not written than otherwise. The problem is how to avoid this confusion? It must be admitted that the existing system of distribution consisting, as it does, in salesmen or inspectors representing their own office, of course aggravates the problem. Not only does it result in the number of experts being large, but each very probably is influenced by considerations other than the requirements of the prospect. It is impossible it should be otherwise. The solution, however, lies not in the reform of this system but with the policyholder himself. He would do better to consult only one expert and to have faith in him. When the expert is not confronted with the competition of other experts in the profession, he will give you the best advice even at his personal sacrifice. A really intelligent and conscientious agent can give you better suggestion than a score of experts if you confide in him your actual financial condition and insurance requirements. By this, however, I donot mean that inspectors or organisers should be done away with. The present system has the great merit of keeping companies fairly in close touch with the public; it enables companies to some extent to select their business by pushing especially those classes which may be particularly desirable they should write under existing conditions, and it gives the companies control over the sales forces, enabling

them to educate and direct them, an advantage which, it is no less to be hoped, may be retained because it has not been made the most of in the past. The sales system might also be improved by educational publicity. The public must be made to realise that life insurance requires planning. They must be brought to regard it as providing the means of building up a whole scheme of the future and not as a service to provide for isolated ones as they present themselves.

China Follows Suit.

The National Government of China has taken up the work of consolidating their economic resources by protecting them against foreign competition in an earnest and serious manure. The recent Insurance Companies Act which will come into force shortly is one of those protective exactments, and follows the lines of the insurance legislation in Italy, France, Poland and some Balkan countries that have sought to safeguard their insurance companies against foreign competition. The new Act defines as a chinese company all jointstock insurance companies whose shareholders are all Chinese, or in the case of insurance other than personal insurance any Company in which the Chinese hold more than two-thirds, of the share-capital, or more than two-thirds of the directors are Chinese and the general manager is Chinese also. In the case of mutual offices, all members must be Chinese. A foreign company, which establishes a branch in China, or hires agents or brokers within the territory of China, shall previously obtain sanction from and make registration with the Ministry of Industry of the Chinese

National Government. Chinese insurance companies must invest their capital and reserve funds in certain specified securities, and no less than 80 % must be invested within China. Both home and foreign companies must make a deposit with the State Treasury, which shall amount to 15 % of the first 500,000 (Chinese national currency) capital, and 5 % of the excess amount, with a maximum of 200,000. The security shall be given in Chinese national currency, but may also be given in Government Bonds or Treasury Bills at the discretion of the Ministry of Industry.

Aviation Risks.

The recent heavy list of air disasters has again raised the question of the part which insurance is going to play in the development of civil aviation and is the subject of comment in European insurance journals. The Royal Dutch Air Lines have been heavily affected and had to suspend operation in certain routes owing to the lack of experienced pilots. British available insurance interests which are heavily involved in the Dutch Company have also been seriously affected. Insurance cover is so essential for the growth of civil aviation, that we cannot think any more of underwriters' refusing to accept aviation risks. The City Editor of *The Times* takes the opportunity to reiterate the obvious fact that underwriters specialising in the provision of insurance against aviation risks must desire to promote civil aviation and must wish that unnecessary risks would be avoided, and that this very fact places these in an exceptionally favourable position to submit to the authorities, in the

general interest, views based upon wide experience and a careful study of the conditions. The recent air disaster in America resulting in the death of Wiley Post and Will Rogers, the American film-star, has also led the insurance journals to suggest that accident policies should contain a definite clause as to the avoidance of adventurous flights out of the regular air services existing at present. Will Rogers had accident policies with Lloyds and other British companies for a sufficiently large amount.

Moonlight Insurance Society Ltd.

In order to bring the benefits of insurance within easy reach of the poor the Moonlight Insurance Society Ltd. has inaugurated some new plans to afford the mass the opportunity of insuring their lives with a very small income. The society is doing good business. Head office of the Society is at 21 Old Court House Street, Grosvenor House, Calcutta.

The Napier Insurance Co. Ltd.

The Napier Insurance Co. Ltd. of 3, Commercial Bldgs., Clive Street, Calcutta has been transacting provident insurance business since 1933 and has in the meantime issued more than 4000 policies and paid Rs. 3000 in claims.

The Salvation Insurance Co. Ltd.

The above company has been formed with the object of carrying on the provident insurance business, thereby to help the poor to make some provisions for their wives and children. The register-office of the company is situated at 1 Clive Row, Calcutta.

The Capital Insurance Ltd.

The company carries on business of insurance of all descriptions generally on the lines of provident insurance basis and now it is mainly working on industrial insurance schemes. The balance sheet of the company for the year ending 31st. December, 1934 shows that the company has Rs. 2568-0-0 in its reserve fund. The managing agents are The Bengal Syndicate, 13, Bow Bazar Street, Calcutta.

The Mutual Life Assurance Corporation Ltd.

The above assurance corporation has some special features. Proposals for assurance on the lives of females are not generally accepted in this country but this company accepts such proposals on the assured's supplying proof of identification. In addition to this it issues joint life assurance policies and guarantees triple benefit policy. Chief agents are Messrs Ghose Dastidar & Co., 81A, Clive Street Calcutta.

The Swastika Insurance Society Ltd.

The company has been started with a view to carry on the business of Provident Insurance Society Act. V. of 1912 and under the rules made by various local government in India under act V of 1912. Managing agents are Messrs National Union Co., 8, Old Course House Corner, Calcutta.

The Basanti Insurance Co. Ltd.

The above company was found in the year 1930. Since its day of existence it has been serving the poor mass. The tables of company's life prospectus

afford a real life insurance protection to people of smaller means as it is this company which pioneered in the field of Provident Insurance to take the risk of proponents' life even from the date of policy after making necessary medical examination. We wish the company success. Managing agents are Hindoosthan Farmers, 31, Ashutosh Mukherjee Road, Calcutta.

The Bengal National Assurance Co. Ltd.

The Bengal National Assurance Co. Ltd. of 98, Clive Street, Calcutta, has come to the field of insurance with the schemes which have been prepared to suit the small earnings of the poor labourers, and the middle class people. Medical examination and immediate risk is a unique feature of the company. There is another special feature of the company. This company does not charge any extra fees such as admission fee, annual fee, stamp fee etc. from the policyholders. Managing agents are Messrs N. N. Chatterjee & Co., 98, Clive Street, Calcutta.

The Indian Mercantile Insurance Co. Ltd.

In the east the Company has secured in their Chief Agents Messrs. M. R. Shah & Co., of 95, Clive Street, Calcutta, a strong organisation who, we understand, are highly influential and well known in insurance circle. As is expected of them they have more or less passed through a struggling period of making known to the insuring public the popularity of the Company's life policy contracts in a practical sense. We wish them onward great success and a prosperous future,

SMALL TRADES & RECIPES

Chaulmugra Ointment.

Chaulmugra oil	10 parts by weight
Hard paraffin	40 " "
Soft white paraffin	50 " "

Melt the hard paraffin over a slow fire and incorporate the other two ingredients. This ointment is very efficacious in leprosy, lupus, eczema, etc.

Lubricant for Belts.

Lubricant for belts can be prepared by heating 50 parts of linseed oil and 24 of ordinary turpentine on a water bath, and adding gradually and with constant stirring 23 parts of rosin finely pulverized, and finally $1\frac{1}{2}$ parts of colcothar, which is nothing but a dark and red iron peroxide obtained by calcining copperas.

Cold Cream.

White wax	1 oz.
Spermaceti	1 oz.
Oil of almonds	$\frac{1}{4}$ pint.

Melt the ingredients together on a water bath and pour into a stone mortar which has been heated by being immersed in hot water; add gradually rose water, 4 fl. oz.; and stir until an emulsion is formed, and afterwards until the whole is nearly cold, put in pots.

Candy Sticks.

Melt 1 lb. granulated sugar in 1 gill of water, add 4 oz. glucose and stir until dissolved. Boil until the toffee breaks crisply when put in cold water. Then pour into a large earthenware dish and flavour and colour to taste. Fold over and over with a wooden spatula, and when cool pull out with the hands, double and pull again until it is too hard to work any longer. The last pulling should be rather thin. Cut in sticks and put in an airtight bottle.

A great variety of this inexpensive and wholesome sweet can be made by adding different flavour and colour.

Mixture for Cleaning Silver Articles.

Whiting	$\frac{1}{2}$ lb.
Gum camphor	$\frac{1}{4}$ oz.
Aqua ammonia	1 oz.
Alcohol	1 oz.
Benzine	3 oz.

Mix well together, and apply with a soft sponge, and allow it to dry before polishing.

Tin Tree.

Into a suitable white glass bottle put 3 drachms of stannous chloride and 10 drops of nitric acid, and nearly fill it with water. Suspend a piece of zinc about 1 inch long and a quarter of an inch thick, by means of a thread (perpendicularly) from the cork; set the bottle aside, where it will not be disturbed, and metallic vegetation will commence.

Soluble Tea.

Tea	1 part.
Boiling water	7 parts.

Digest at a heat of 170°F for half an hour, and evaporate in a low temperature in a vacuum. In this way an excellent extract of tea can be made, which preserves many of the qualities of the leaves, and will produce a cup of decent tea by adding a few grains to the hot water. The lower the temperature at which the evaporation is carried on, the finer the quality.

Lime Juice Cordial.

Glucose syrup	8 gals.
Cane sugar	108 lbs.
Water	20 gals.
Lime juice	18 gals.
Oil of orange	4 dr.
Oil of nutmeg	4 dr.
Salicylic acid	2 oz.
Rectified spirit	10 oz.

Dissolve the sugar in the water; heat, add the lime juice and glucose syrup. Dissolve the oils and the acid in rectified spirit, mix with the cordial and final filter through a felt bag.

India's Industrial Progress.

Coffee Cess Bill Passed.

The coffee industry has of late been going downhill and those interested in it have during the past two years been clamouring for the levy of a cess to be devoted to propaganda outside India. Coffee growers have repeatedly requested the Government of India to take this step, as competitors in world markets have been steadily making headway at the expense of the Indian product through systematic propaganda. Exports from India to the United Kingdom have come down to a third and to France to a half of what it was before. How severe has been the declension will be evident from the fact that the value of exports has, during the past few years, dwindled from Rs. 2.5 crores to Rs. 1.2 crore which certainly affects the balance of trade.

India and Kenya enjoy the same preference in the British market, but Kenya does better mainly because of propaganda. The Government of India was therefore induced to introduce a Bill at the current session of the Legislative Assembly and this has just been passed. The measure provides for a duty up to one rupee per cwt., but it is not proposed at present to impose more than a cess of eight annas. Indian representation on the Committee to administer the cess will not be less than 12 as against 8 Europeans, as there are more Indian than European planters. It is expected that as the result of the cess the small planter will benefit more than the bigger planter.

Burma has been left out of the scheme at her own request as she grows very little coffee and what little is grown is consumed locally.

Paper from Bamboo in Hyderabad.

The Commerce and Industries Department of Hyderabad has issued a report on the possibilities of manufacturing paper from bamboo pulp on a commercial scale in the State. The Director of Industries hopes that local capitalists will carefully consider it.

The report states that on an outlay of Rs. 50 lakhs, 11.1 per cent. profit can be realised a year. Indian requirements are 20,000 tons of paper a year and a 5,000 tons plant at Adilabad which provides exceptional facilities in resources, labour and transport will command a good market. A factory at Sirpur or Mancherial can sell from 700 to 800 tons of produce in the State and be benefited by the protective duty of 5 per cent. ad valorem. The profits of a company formed will be free from income-tax which is not levied in the State.

The Government benefits as the owner of large bamboo forests, as the largest individual purchaser of paper in the State and as the owner of the railway whose earnings will increase when the material and paper are transported.

Since the Government of India has extended protection to the paper industry up to March, 1939, the industry, concludes the report, is bound to be attractive.

Industrial Intelligence and Research.

Since the formation of the Department of Industrial Intelligence and Research, Delhi, much progress has been made in collecting information and formulating plans for its future working. The new department was placed under Sir James Pithkeatly, the Chief Controller, Indian Stores Department, as his department had the necessary machinery and much information to assist in the formation of the new one. Mr. N Brodie, who was appointed Director, toured the Provinces and the principal States conferring with their Industries Departments and since his return, there has been steady progress in getting things into shape.

An Advisory Council for Industrial Intelligence and Research has been formed, consisting of Directors of Industries or corresponding officers from each Province and interested States, representatives of certain departments of the Government of India and non-official member nominated by the Government of India and the Provincial Governments. The membership of this Council totals about 40 and functions are purely advisory.

Utilizing By Products.

The possibility of manufacturing alcohol from molasses, starch from broken rice and lime juice from limes, is referred to in the report on the operations of the Department of Agriculture, Burma, for the year ended March 31, 1935.

The Agricultural Chemist has been engaged in some very interesting and important investigations into the case of industries subsidiary to agriculture. Among others he has examined the possibility of utilizing the molasses which are a waste product from sugar factories—an important matter owing to the recent establishment of several white sugar factories in this province. He has been able, by means of experiments conducted at the Mandalay Brewery, to obtain an improved alcohol yield from molasses and has given advice to others

regarding the manufacture of methylated spirits from the same. He has examined the possibility of utilising limes for the manufacture of lime juice and has been able to produce a product equal in quality to the best imported lime juice. He has also taken up the question of the manufacture of starch from sweet potatoes and from rice and the results so far obtained go to show that the manufacture of starch from broken rice might be an important industry in this province. Another matter under investigation is the possibility of making condensed milk, ghee and other milk products.

Printing Industry

An Academy of Printing for training young men and women in various departments of the printing industry was opened by Mr. K. Natarajan at Vithalbhai Patel Road, near Congress House, Bombay, recently.

The Academy has been started under the auspices of the Bombay Press Owners' Association and in the initial stage it will train apprentices in composing, machine-mending, press work and proof reading. Later on, when better facilities are provided, the Academy will impart instruction and training in book-binding, photo engraving, lithography and type founding.

The curriculum prepared by the Academy is intended to give technical and theoretical training to students.

Murshidabad Silk Industry.

Efforts are being made by the Government of Bengal to revive the silk industry of Murshidabad. An officer of the sericulture department has been sent there with a number of demonstrators. Cultivators will be induced to plant mulberry trees again and rear silk worms. The Government will, if necessary, purchase silk worms and prepare silk thread for sale. An effort will be made to standardize the price of silk worms and silk yarn. The Government will also distribute healthy silk worms free of cost to the cultivators.

Molasses as Fertilizer.

In publications on the utilization of molasses as a fertilizer Prof. Dhar and his collaborators have shown that the ammonium salts and the total nitrogen of the soil are increased when molasses are added to the soil, which has to be aerated by ploughing.

It is well-known that when energy-rich substances like carbohydrates, proteins etc., are added to the soil its microbial population is greatly increased, as the micro-organisms can utilize the energy-rich compounds as food for their growth and multiplication. The micro-organisms are helpful in the decomposition of the soil organic compounds, and in the conservation of the nitrogen and thus the porosity and fertility of the soil is increased. The workers at Allahabad and at Java have shown that the fertilizing action of molasses when added to the ordinary soils, is due almost exclusively to the carbohydrates existing in the molasses as it has been established that the effect produced by equivalent amounts of nitrogenous compounds potash, and phosphate on the growth of vegetation is exceedingly small in comparison with the effect produced with molasses.

Molasses to the extent of 90—360 maunds per acre has been applied to some alkali lands near Allahabad, Cawnpore and other places in the United Provinces and the lands ploughed once and watered. Analysis showed that the alkalinity of these lands decreased considerably on application of molasses and later on became appreciably acidic. The acids were oxidized in course of time. In these reclaimed lands, good crop yield has been obtained.

It is clear therefore, that over and above, the well-known methods available for the reclamation of alkali soils (e.g. addition of powdered sulphur, gypsum, ammonium sulphate etc.) molasses can be utilized in the reclamation of alkali soils. This process should be useful especially in areas near sugar factories. Molasses when added to the soil neutralizes

the sodium carbonate of the alkali soils increases the soil micro-organisms, the nitrogen and ammonia contents, and also the water tilth and humus content. The calcium added with molasses also helps in the conversion of the sodium clay into the calcium one and all these go towards the reclamation of the alkali soils.

All-India Hand-weaving Exhibition.

It is understood that the Government of India have made a special grant of Rs. 10,000 out of the sowings from the grants of Rs 5 lakhs announced for the marketing of hand-woven goods, for holding an All-India Hand-Weaving Exhibition and competition along with the Bihar and Orissa Provincial Exhibition to be held at Patna from February 9 to February 24, 1936.

Fostering Bengal's Industries.

The activities of Engineering section of the Industries Department of the Government of Bengal during the year were directed towards the evolution of new processes of manufacture which could revitalise the small and cottage industries of the province.

Brass and Bell-Metal.

Thus in the brass and bell-metal industry, the manufacture of less complicated building and sanitary fittings and the casting of tea and table spoons and other articles made of German silver have been standardised, while an improved blowing arrangement and a new type of floor furnace evolved by the department are already growing popular among small industrialists because of the reduction in capital cost, low consumption of coke and economy of time in melting.

Umbrella.

In the umbrella industry successful experiments have been concluded standardising the process of using polo and root canes as basic raw materials for umbrella handles, which can be made use of in cottage factories.

Scientific & Technical Topics.

Sound Speeds Up Potato.

Potatoes have been stimulated into earlier sprouting and blossoming and larger tuber yield at maturity by subjecting the seed pieces to sound waves far beyond the range of audibility. Experiments at the Soviet state X-ray institute resulted in increasing the yield by from sixty-four to sixty-nine per cent. The sound waves were produced by an electrically excited quartz crystal operating in an oil bath at a frequency of about 400 million cycles per second. The uppermost limit of audible sound waves is only about 20,000 cycles.

Existence of an unseen spot of red light in the spectrum that has a strong retarding effect on germination of seeds has been discovered by scientists. Ordinarily this power is nullified by the more friendly rays of sunlight that promote growth, but it was observed by breaking up the spectrum. Green, blue and violet rays had previously been shown to have an inhibiting effect on seeds while red, orange and yellow light speeded germination. The newly found red spot was located in the red portion of the spectrum near the point where light ceases to be visible to the human eye.

Death-Rays Can Benefit Mankind.

Although the so-called "death-rays" (ultra-short waves) may be of little menace to human beings, they can be turned to new uses for the benefit of mankind. This fact emerges from a

recent research from Russia. By exposing grain, to be used was rendered entirely free from pests. In addition, the grain, so treated, when sown produced much stronger plants than those grown from ordinary seed, while an appreciable increase in crop is said to have resulted from the treatment of the seed. Similar experiments, in which fresh fruits and vegetables were exposed to the influence of rays for one second, and said to have resulted from the treatment of the seed. Similar experiments, in which fresh fruits and vegetables were exposed to the influence of rays for one second, and said to have brought about an improvement in their flavour and lengthened the time they remained fresh under ordinary conditions by several days as compared with untreated fruits and vegetables.

Propeller Sail Boat.

This peculiar boat is the invention of an American engineer. Actually it is a sailing vessel, but in place of the orthodox sail the boat has a large propeller which revolves, as it is blown by the wind, and drives a small screw at the stern. The boat is said to be able to sail into the eye of the wind. The mast which supports the sail-propeller can be turned so as to bring the latter into the wind.

Chemical Blood Transfusion.

After considerable experimentation two Russian chemists claimed to have

discovered the perfect substitute for blood for transfusion purposes. The solution, which is hermetically sealed in glass phials, is composed of all the salts present in the blood. It keeps in perfect condition for a considerable time and eliminates the delay and uncertainty connected with obtaining supplies from blood donors. The discovery, which promises to be of world-wide importance, was made in the Ukrainian Institute of Pathology.

Typewriter for the Blind.

Alexander Birilev, the Russian blind inventor, has just devised a typewriter expressly for the sightless. The machine, which is chiefly made of wood, is remarkable for its extreme simplicity and efficiency. At present it is being sold for a nominal sum in Russia. It is to be hoped that this useful aid for blind writers may find its way to India in the near future.

Wool from Milk.

According to an Italian Newspaper "Agricoltura di Fascista" Italian Scientists have invested a process of producing excellent wool from milk.

The paper claims that one pound of wool can be made from one pound of milk. The price is stated to compare favourably with that of ordinary wool.

In this connection Signor Gayda, suggests in the "Giornale d'Italia" that in order to counteract the economic sanctions synthetic wool will be produced from milk.

Self-Illuminated Pencil.

Writing in the dark is made easy by a new type of self-illuminated pencil. The hollow barrel contains a flash-light battery and a small bulb, and the light is directed on the writing, when a switch button at the end of the barrel is de-

pressed, through a transparent window of unbreakable plastic material at the lower end of the pencil.

Tiny Radio in Cigarette Case.

A radio built into a cigarette case was a novelty exhibited at a recent British radio exposition. The miniature receiver employs a single tube—one of the smallest in the world—and has a pair of midget tuning dials. Only half the thickness of the case is occupied by the set, ample room remaining for about a dozen cigarettes. The radio is turned on or off by means of a knob at the outer edge of the case, which is shown open in the accompanying photograph to reveal the compact units of the midget receiver.

Aluminium Saves Silk Stockings.

Our readers will be interested in a new process for preserving silk stockings, recently reported from America. The stockings are dipped in a hot dilute solution of aluminium sulphate, washed and then dried, and the process is said to lengthen their average life by a gratifying amount.

Linoleum—An Astounding New Property.

From the faculty of hygiene at the German University of Wurzburg comes news of a discovery, concerning a very common household adjunct. After many months of patient work Professor Lehmann, head of the department, claims to have definitely established that ordinary linoleum of good quality has valuable antiseptic properties! Its potency is comparable to that of well-established disinfectants.

Professor Lehmann's experiments are against the practice of polishing linoleum, as this reduces its germicidal value. Linoleum should be washed often with soap and water.

Formulas, Processes & Answers.

Tyre Puncture-Proofing Composition.

1905 V. N. K., Ranibennur—Desires to know a formula for preparing tyre puncture-proofing composition.

A puncture-proofing composition for pneumatic tubes consists of gum tragacanth 8 lbs. dissolved in 14 gallons of water, containing 16 oz. of short threads of cotton and plasticized with sugar 142 lbs., salicylic acid 8 oz.; alcohol 7 gallons, magnesium carbonate 45 lbs. and magnesium silicate 27 lbs.

Insect Powder.

2015 K. L. B., Multan Cantt—Desires to know formulas for preparing insect powder, fruit jellies, etc.

A stronger insect powder, is prepared by mixing pyrethrum powder with 10 per cent. of powdered quillaia. The following have also been recommended:—

I.

Insect powder	14 oz.
Powdered quassia	6 oz.
Powdered white hellebore	2 oz.

II.

Insect powder	8 oz.
Powdered colocynth	4 oz.
Powdered white hellebore	16 oz.

Synthetic Fruit Jellies.

LEMON.

White sugar	16 lbs.
Glucose	8 lbs.
Gelatin	3½ lbs.

Water	80 oz.
Citric acid	1½ oz.
Oil of lemon	1 oz.
Orange colouring	q. s.

Soak the gelatin until soft in sufficient water to cover it. Boil the sugar and half the glucose in water to a temperature of 240°F; remove the pan from the fire and gently stir in the remainder of the glucose, the gelatin, and the acid. Let the pan remain a short time, then skim off the top; next add the oil of lemon, previously mixed with 4 oz. of alcohol. Run the mixture into tins, and when cold put into a warm cupboard for a few days to mature, then cut.

ORANGE—Oil of orange ½ oz., citric acid 1 oz., and orange-flower water 8 oz.

STRAWBERRY—Use ½ oz. citric acid, essence of strawberry 8 oz., and cochineal colouring a sufficiency.

RASPBERRY—The same proportion of acid, flavour and colouring as for strawberry, use other essences similarly.

Jelly Crystals.

Jelly crystals have of recent years become popular as a basis for preparing table jellies in preference to the tablet form like above since they possess the advantage of enabling a jelly to be prepared within a shorter space of time than is the case with the tablet. In the preparation of jelly crystals a fine, not too coarse granulated sugar should be used and the basis consists of the following mixture.

Granulated sugar	48 lbs.
Gelatin, in coarse powder	7 lbs.
Water	8 gallons.
Tartaric acid, in powder	3 oz.
Oil of lemon	2 oz.
Colour	q.s.

Soak the gelatin with a small quantity of water. Now boil the sugar with water so as to make a syrup of sugar. Then add the acid and gelatin and continue heating until they dissolve in the syrup. Lastly remove the pan from fire and add the oil of lemon and colouring material. When cold put in tins.

Other varieties may be prepared by using the appropriate flavouring essence in place of the oil of lemon.

Cement for Movie Films.

2020 B. L. M., Jamshedpur—Wishes to have formulas for preparing cement for films, and office paste.

This quick drying adhesive is very effective in bonding celluloid to itself or connecting lengths of motion picture films.

Cellulose nitrate or
clean Transparent

Celluloid Scrap	10 parts by weight.
Acetone	8 " "
Methanol	27 " "
Benzol	45 " "
Methyl cellosolve	10 " "

For use with movie films, the gelatin emulsion surface is removed with sand paper or scraped off with a pen knife. Other celluloid surfaces should preferably be cleaned and slightly roughened. The above liquid is applied with a brush and the moistened surfaces pressed together.

Office Paste.

Starch	7 parts.
Dextrine	3 "
Salt	9 "
Zinc chloride	4 "
Water	175 "

Mix the starch and dextrine into uniform paste with some cold water. Heat the rest of water to boiling, add salt and zinc chloride, and gradually add starch mixture.

Effervescent Lemonade Tablets.

2076 S. C. J. W., Jaffna—Desires to know formulas for preparing lemonade tablets, sodium bicarbonate lozenges, etc.

These tablets are best made by compression, using such powders as lemon kali, which is composed of the following:—

Sugar	4 lbs.
Tartaric acid	2 lbs.
Sodium bicarbonate	2 lbs.
Oil of lemon	2 dr.

A similar article, intended for putting into a tumblerful of water, is made by mixing 8 oz of icing sugar with 1 oz. each of sodium bicarbonate and tartaric acid and 10 drops of oil of lemon; make this powder into a paste with a sufficiency of alcohol, roll out the mass to the thickness of $\frac{3}{8}$ inch upon paraffin paper, divide into squares, and dry at a gentle heat.

Sodium Bicarbonate Lozenges.

Sodium bicarbonate	100 grms.
Powdered sugar	890 "
Tragacanth gum	10 "
Water	80 "

Make a mass with the ingredients and cut in cubes of 1 gm. each.

Potassium Chlorate Tooth Powder.

Precipitated chalk	10 oz.
Potassium chlorate	1½ oz.
Borax	1 oz.
Oil of wintergreen	20 mins
Oil of peppermint	20 mins.

Take the ingredients in fine powder before mixing. Now triturate the borax and the oils with about half the quantity of precipitated chalk until well mixed; on a paper lightly mix the potassium chlorate with the remainder of the chalk by means of a wooden spatula. Carefully mix the whole together and pass through a fine sieve.

Ink for Writing on Iron & Steel.

2088 K. C. W., Wazirabad—Wants a formula of ink for writing on Iron and Steel.

Copper sulphate	2 dr.
Dilute acetic acid	½ dr.
Lampblack	½ dr.
Mucilage of acacia	2 dr.
Water to produce Mix	1 oz.

Mosquito Destroyer.

2101 S. C., Calcutta—Wants to have a good formula for preparing mosquito destroyer.

Powdered charcoal	16 oz.
Potassium nitrate	2 oz.
Benzoin	4 oz.
Hard tolu balsam	2 oz.
Insect powder	4 oz.

Tragacanth mucilage a sufficiency.

Powder the solids and make into a stiff paste with the mucilage. Then form the mass into spiral of usual size and dry in air.

Hair Dye Powder.

2100 B. S., Datwali—Wishes to

have recipes of hair dye powder, French polish, etc.

Powdered soap	9 oz.
Exsiccated sodium carbonate	3 "
Borax	3 "
Henna powder	2 "

Put up in 2 dr. packets. For use dissolve the contents of a packet in a cupful of hot water, sufficient to saturate the hair and enable the production of an abundant lather.

French Polish.

Shellac	16 oz.
Benzoin	½ "
Sandarac	1 "
Methylated spirit	80 "
Dissolve and strain.	

Liquid Glass.

This is the name given to the old linseed oil and vinegar furniture polish containing a little putty powder:—

Linseed oil	20 oz.
Vinegar	10 oz.
Hydrochloric acid	4 oz.
Amyl acetate	1 dr.
Putty powder	1 dr.

Shake the bottle and apply the polish with a wad of soft linen with gentle friction; finish off with a soft duster.

Preparation of Ethyl Chloride.

2629 D. C. S., Bandra—Wants to learn the process of preparing ethyl chloride.

To prepare ethyl chloride take a stout glass flask for generating hydrochloric acid gas. Strong sulphuric acid is dropped from a tapping funnel on to strong hydrochloric acid. The gas is passed through an empty vessel and then into a flask containing a mixture of ethyl alcohol and half its weight of

coarsely powdered zinc chloride. The flask, which is heated on a water-bath is provided with an up-right condenser, from the top of which the vapour is conducted into a flask containing water. The inlet tube is cut off just above the surface of the water. Then the vapour passes into the tower filled with soda-lime, and finally into the U-tube, which is surrounded by ice. The condensed ethyl chloride drops from the bottom of the U-tube, and is collected in a small vessel standing in ice. The condenser attached to the flask containing ethyl alcohol, cools the alcohol vapour, and returns the liquid to the flask. The excess of hydrochloric gas which passes on is absorbed by the water and what remains is removed by the soda-lime tower.

Gilding Glass Bangles.

2007 B. R. S. N. C., Firozabad—Wishes to have a process of gilding glass bangles, also process of making mirror, etc.

Glass bangles are gilded by blending powdered gold with gum water and a little borax, and applying the mixture by means of a camel hair pencil. Gold powder required for the purpose is prepared by rubbing down gold leaf with a little honey or gum water in a porcelain dish until the gold is completely transformed into powder, after which the honey or gum is washed away. The process may be repeated three or four times to obtain the desired effect. The painted bangles are then heated in an oven or furnace, by which means the gum is burnt, and the borax, vitrifying, cements the gold to the surface.

Mirror Making.

Plate glass is "silvered" by means of an amalgam of tin and mercury. Tin foil is beaten from pure tin; it is spread smoothly on a table, mercury is spread over it, and the glass plate (which must be perfectly clean) is pushed gently on to the surface, commencing at the edge. The glass is allowed to remain for 24 hours; it is then removed to a wooden incline and allowed to drain; the inclination is gradually increased till the plate is perpendicular, when the process is finished.

Preparation of Silver Nitrate.

Silver nitrate is prepared by digesting metallic silver with moderately strong nitric acid; the silver speedily dissolves, especially if heat be applied. Some of the nitric acid is decomposed yielding oxygen to the silver, and liberating oxides of nitrogen which in contact with air turns brown. The clear solution is then evaporated, either to the crystallising point or to dryness. If ordinary standard silver be used the solution will contain some nitrate of copper; in this case it must be evaporated to dryness, and gradually heated till all the nitrate of copper is decomposed, which may be known by taking a little of the salt, dissolving in water, and adding excess of ammonia; when, if copper be still present, the solution will have a blue tint. When all the copper is thus rendered insoluble, the fused mass is dissolved in distilled water, evaporated and crystallised.

Pain Killer.

2016 K. B. S., Bodeli—Wants a good recipe for preparing pain killer.

Alcohol	1 quart.
Gum guaiacum	1 oz.
Gum myrrh	$\frac{1}{2}$ oz.
Camphor	$\frac{1}{2}$ oz.
Cayenne, pulverised	$\frac{1}{2}$ oz.

Mix. Shake occasionally for a week or 10 days, and filter or let settle for use. Apply freely to surface pains. This is said to be a very efficacious pain killer.

Iodised Sarsaparilla.

First, prepare a compound decoction of sarsaparilla in the following manner:—

Sarsaparilla, cut transversely	2 $\frac{1}{2}$ oz.
Sassafras root, in chips	$\frac{1}{4}$ oz.
Guaiacum wood turnings	$\frac{1}{4}$ oz.
Dried liquorice roots, bruised	$\frac{1}{4}$ oz.
Mezereon bark	$\frac{1}{4}$ oz.
Boiling distilled water	20 fl. oz.

Digest the solid ingredients in the water for an hour, boil for 10 minutes, cool, strain and make up to 20 fl. oz.

Now also prepare a concentrated infusion of gentian compound according to the direction given

Gentian root (bruised) 4 $\frac{1}{2}$ lbs; boiling water q.s. to cover it; infuse with occasional agitation for 2 hours, express the liquor, wash the marc with a little boiling water and evaporate to 13 quarts, when cold, strain through flannel, and rectified spirit 1 gallon and pour the mixed fluids on dried orange peel, 4 $\frac{1}{2}$ lbs. and fresh lemon peel, 9 lbs. macerate for 1 week, then express the liquor in a powerful press, and filter.

After this proceed for the final preparation.

Potassium iodide	1 dr.
Ammon. carbonate	1 dr.
Spirit chloroform	2 dr.
Decoction sarsaparilla co	5 oz.
Infusion gentian co	10 oz.

Mix, filter and bottle.

Hair Dye Powder.

2100 B. S., Datwali—Wants a recipe for preparing hair dye powder.

Litharge	1 part.
Freshly slaked lime	2 parts.
Starch	2 parts.

Make the ingredients very fine powders and dry perfectly; mix and keep the compound in well-corked bottles. This powder is to be made into a thin paste with water and applied to the hair (previously freed from oils with soap and water, and dried), by means of a sponge or brush, or the fingers. Continue rubbing with it the roots of hair and pass a comb for some time occasionally adding a few drops of hot water to preserve the whole moist. Now conclude by washing with soap and hot water solution.

Liquid Gold.

2723 B. D., Calcutta—Wants a recipe for preparing liquid gold.

Liquid gold may be prepared by a solution of gold in a mixture of hydrochloric and nitric acids, to which sal-ammoniac and alembroth, a triple compound formed by salt and ammonia and corrosive sublimate, have been added. This solution of gold evaporates to the consistency of oil, and is then applied to the silver or nickel, both of which it blackens, but they appear gilded on being heated.

Preparation of Lime Mortar.

2159 J. B., Bellary—Wishes to have formula for preparing lime mortar.

To prepare lime mortar for building purpose the proportion of brick dust to slaked lime is as follows:—

Brick dust	3 parts.
Slaked lime	1 part.
Water, sufficient quantity.	

Mix the two solids thoroughly then add sufficient quantity of water to make it into a paste suitable for your purpose.

Purification of Vinegar.

1953 K. A. C., Calicut—Wants to know the method of purifying vinegar.

In order to purify vinegar, fresh vinegar is allowed to remain undisturbed for several weeks to mature. During this storage period it deposits albuminous matter, bacterial cells, etc., and undergoes partial clarification. The liquid is then syphoned to filtering tanks filled with paper pulp, through which it percolates.

The persistent cloudiness, which occurs in certain vinegar is sometimes more rapidly removed by a process of clarification than by filtration. The methods employed are sometimes mechanical and sometimes chemical. In the first case an insoluble substance such as kieselguhr is stirred up with the vinegar and as it slides it carries down with it the albuminous particles to which the turbidity is due.

In chemical methods the albuminous substances may be precipitated by the addition of a gelatinous agent such as isinglass.

Washing Soap by Semi-Boiled Process.

2222 M. L. S., Sangamner—Desires to know a formula for manufacturing washing soap with groundnut oil.

Groundnut oil	50 seers.
Coconut oil	20 "
Caustic soda 77°	10 "
Water for caustic soda	1½ mds.
Silicate of soda	10 seers.
Water for silicate	10 "

Prepare the caustic soda lye with the water, which should be of 26°Be strength. Heat the oils in the iron pan. When a cracking sound is perceived on addition of a few drops of water, cover the mouth of the oven with an iron plate or remove the pan from the oven. Then add the lye and incorporate it with the oil thoroughly. Then heat the pan for a short time whereby the oils are saponified. Then add the silicate solution and continue boiling with the formation of soap. Finally run the soap into frame and allow to cool.

Rubber Solution.

2224 K. L. B., Sialkot—Wants to know a process of preparing rubber solution.

To prepare rubber solution, take raw rubber and masticate it in a kneading machine. The masticated rubber is then put in an appreciable quantity of naphtha or benzine and frequently shaken until dissolved. The solution obtained is less viscous than that from the untreated rubber. On allowing to stand, the protein film separates and forms a deposit at the bottom of the solution. When the solution is prepared on a large scale, it is forced through fine gauze filters.

Shaving Soap.

Tallow	250 parts.
Coconut oil	125 "
Lard	25 "
Caustic soda lye of 30°Be	275 "
Caustic potash lye of 20°Be	75 "
Oil of lavender	1 part.
Oil of thyme	$\frac{1}{2}$ "
Oil of cumin	$\frac{1}{2}$ "

Melt together tallow, coconut oil and lard and allow the mixture to cool off to 115°F. Then add the caustic soda lye and caustic potash lye with gentle stirring and perfume the soap with the oils stated above. Set aside for a day and then cast into sticks by means of moulds.

Face Powder.

Zinc oxide	7 oz.
Talcum powder	9 "
Precipitated chalk	1 "
Magnesium carbonate	1 "
Extract of jasmine	30 mins.
Extract of white rose	15 "
Mix well and run through fine sieve	

Manufacture of Plaster of Paris.

2225 B. B. S., Kottai—Wishes to learn the processes of manufacturing plaster of Paris and hair dyeing oil.

To manufacture plaster of Paris, first of all grind gypsum to fine powder in a disintegrator. Then screen it through 100-120 mesh sieve and calcine in iron caldron with continuous stirring at a temperature of 120°C. By this treatment gypsum loses the greater portion of water it contains. Lastly pack the pre-

pared plaster of Paris in air-tight barrels either of tin or of wood.

Hair Dyeing Oil.

Take 4 srs. of raw and good sesamum oil and 4 srs. cleaned and crushed emblic myrobalans. First steep the myrobalans in water for 24 hours; pound them thoroughly and dissolve in 16 srs. of water. Then put the oil in an iron pan and apply moderate heat. When the oil has bubbled for some time and the froth has subsided, remove the pan some distance away from the oven. Now take a ladle with a long handle, fill it with the above decoction of myrobalans and sprinkle the same on the hot oil. This should be done from a distance, taking every precaution to prevent any accident. Just as the water will be poured on the oil there will be a deafening sound; but the operation should be carried through without any fear. After the whole quantity of the decoction is thus blended with the oil, put the pan on the fire and continue boiling. When the water has evaporated, remove the pan and set it aside with the oil for 7 days. Finally filter and bottle.

Paste for Fixing Labels on Tin.

2321 D. B. C., Delhi—Desires to know a formula for preparing paste for fixing labels on tin.

Mix 1 lb. of rye flour in lukewarm water, to which has been added 1 teaspoonful of pulverised alum; stir until free of lumps. Boil in the regular way or slowly pour on boiling water, stirring all the time, until the paste becomes stiff. When cold add a full $\frac{1}{4}$ lb. of common strained honey; mix well. In 1-2 days always paste the tin and apply the label.

READER'S BUSINESS PROBLEMS

[Reader's business problems will be discussed in these pages. We invite the reader to write us his difficulties. As the department is in charge of an experienced businessman who is specially adept in dealing with such problems and to whom experiences of a large number of successful business men are available, his replies will lead the enquirer to a successful career. These replies will be published in the paper only and cannot be communicated by post.]

Partnership Business.

2481 P. K. D., Jullundur—Requests us to discuss the merits and demerits of partnership business.

A partnership is defined as the relation between persons who agree to carry on a business in common with a view to acquire profit by the same. This relation of partnership arises out of the business when the business would be carried on by them all or by any of them acting for all. This form of organisation is suitable for business which requires a diversity of talents which can be distributed between the different partners. It is also suitable for undertakings which require proportionately large capital and involve risks, which are not capable of being borne by a single individual. There is a great stimulus for successful operation as the risk under such a system is unlimited in character, as each and every partner is personally liable for the debts of the firm, even though the same may have been contracted by any of his partners on account of the joint venture. Owing to the fact that all the partners are personally liable for partnership debts, a partnership has greater facilities for borrowing than any other system. It also affords facilities for a dissatisfied partner to withdraw from it or to have it dissolved.

The first disadvantage of a partnership is that it involves a too great risk

for an individual partner as the liability of each partner is unlimited. Again owing to differences between the partners it may become impossible to continue the business without dissolution. And even if there be no dissolution any friction between them will cause a frequent lack of prompt and united management. A partnership also runs the risk of dissolution at any moment, and as such a large or stable enterprise cannot be formed under this system. Moreover the amount of capital which is necessary for a big enterprise may not be available under this system and in this respect it is inferior to a joint stock concern. There is also disadvantage which a partner suffers owing to the nontransferable nature of his share in a partnership concern. A difficulty is also felt about the withdrawal of a partner without dissolving the partnership.

Importance of Advertisement.

2497 L. M. C., Rangoon—Desires to be enlightened on the importance of advertisement.

Advertisement is no less an important element than salesmanship in the field of distribution of products or commodities. A manufacturer or producer cannot wholly be engrossed simply in production, but he has to adopt means for the sale of the commodities, that is for their distribution. Marketing trans-

portation advertising and selling are the different activities which are involved in distribution.

Advertising is the communication to possible consumers by display, by sample, or by written or printed symbols, of ideas about the product of any enterprise designed to create a demand for that product. Advertisement there must be for every kind of business, in some form or other. It may not be directly detected in the actual sale of goods, but its importance is felt in a knowledge into the minds of the public about the nature and utility, and the price of any particular kind of commodity. It is through advertisement that we learn that a particular type or make of goods of a particular concern is better than another.

The object of advertisement is to reach the public so that there may be a good sale of a commodity and in this respect any expenditure on it diminishes to a greater extent the marketing cost of the article. It is the best means of doing this more cheaply than by any other method. Advertisement creates a demand for the goods in the minds of the people, for it is a psychological truth that if a useful article is brought to the notice, somehow or other, of any particular person, he will have a tendency latent in his mind to possess the same whenever possible. A manufacturer may also create a demand for his manufactured goods by incessant public advertisement with the result that the wholesalers and retailers will be eager to store and sell his goods because of the public demand for the same.

Increasing Customers.

2507 N. R. S., Delhi—I own a small

shop but I cannot attract customers to my shop. Will you please suggest a means to increase customers?

Whether you run a big factory or a small shop, run it on same persistent aim to attract your customers to you and your firm on a friendly tie. It is a big job to find a customer but make the job progressive by holding the customers attached to you. That is indeed a harder thing but that is the new idea to-day and this spells success to every businessman.

Every customer expects fair dealings and honest return for the money he spends. He may be satisfied with this but he will not be moved by this alone—to give him what he expects is not enough. You must be ready to give him in your behaviour more than what he expects—a really sympathetic treatment in his need—give him a pleasant surprise. Whether he has purchased anything from you or not, let your cordiality and attention impress upon him a sense of a friendliness so that he will see for himself that your firm is being run to give him a real service.

Whoever visits your shop, whoever writes to you on any business, whoever comes in touch with your business, send out all the sympathy of your heart to his need, make him a friend. He will never fail to respond to your cordiality. Stimulate the feeling of friendship in you customer—that the new impulse of modern business.

You will remember that well-known passage in one of Herbert Spencers' books in what he says, "If you want to win over people, you must seem to love them; the best way to seem to love them ready to love them."

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of Industry are invited. Enquiries or replies from our experts will be published free of charge. Questions are replied by post on receipt of As 4 stamps of small value only for each question. In order to facilitate the work of Editor's Department and to help prompt action the readers are requested to send enquiries in separate letters.]

2465 S. A. H. S., Lucknow—(1) Rubber shoes may be had of India Rubber Goods Manufacturing Co., 47, Muraripukur Lane, Maunick-tola, Calcutta; Bata Shoe Factory, Konnagar, E. I. Ry.; Bhattacharya Rubber Works, 18, Sura East Road, Belegghata, Calcutta; Calcutta Rubber Works, 1, Sura Cross Lane, Belegghata, Calcutta; Ahmed Abdul Karim Bros. Ltd., 2, Zakariah Street, Calcutta, and B. M. Kharwar, 161/1, Harrison Road, Calcutta. (2) Perfumes, essences, etc., may be had of K. R. Patwardhan, 72, Canning Street, Calcutta; F. N. Sirkar, 37, Canning Street, and Sikri & Co., 55, Canning Street, Calcutta.

2466 D. T. P., Ahmedabad—Seeds may be supplied by Alexander Cross Seed Co., Ltd., 21, Hope Street, Glasgow; Lawson Peter & Son Ltd., 1A, George IV Bridge, Edinburgh and Fujita Zenbei Shoten 36, Kyomachiboridori, 2-Chome, Nishiku, Osaka, Japan.

2467 N. N. D. Arani—Filter press may be had of F. N. Sirkar, 37, Canning Street, Calcutta. First deodorise coconut oil according to the processes described in May 1935 issue of Industry. Now filter through filter press. Process of making taral alta will be found in Indian Perfumes, Essences and Hair Oils published from this Office.

2468 M. P. V., Jamnagar—(1) Process of preparing alcohol will appear in an early issue of Industry. (2) Pill and tablet making machine may be had of Dr. Bose's Laboratories Ltd., 45, Amherst Street, Calcutta. (3) Other machine you require may be had of the above firm. (4) First make blue-black ink powder add some binding agent to it and put in the machine for making tablets.

2469 A. V. S. N., Bangalore City—(1) Sugar machines may be had of Greaves Cotton & Co.,

Ltd., 1, Forbes Street, Bombay; Massey & Co., Ltd., Main Road, Royapuram, Madras, and Burn & Co., 12, Mission Row, Calcutta. (2) You may consult Sugar in India by H. H. Ghose, published from this Office.

2472 C. N. S., Muddanur—Address of Gorio Ltd., is 22, Canning Street, Calcutta. Addresses of other firms you require are not known.

2473 G. R. S., Hyderabad—(1) Gramophones may be supplied by Asteria-Werk Buhler & Co., Balingen-Zillhausen, Wittbg., Germany; Columbia Gramophone Co., New York, U.S.A.; Decca Gramophone Co., Ltd., 1, & 3, Brixton Road, London S. W. 9, and Kurumoto Honten 13, Minami Kyuhojmachichi 2-Chome, Higashi-ku, Osaka, Japan. (2) Talking machines may be supplied by William Tonk & Bro Inc., New York, U.S.A. (3) Calendars may be supplied by American Art Works, Coshocton, Ohio, U.S.A.; Calvert Lithographing Co., Detroit Michigan, U.S.A., and New Indian Press, 6, Duff Street, Calcutta and New Popular Press, 57, Simla Street, Calcutta. (4) Name plates may be had of Bridgeport Metal Goods Manufacturing Co., Bridgeport, Connecticut, U.S.A.; Abdullah & Sons, 37, Moti Sil Street, Calcutta. (5) For Office appliances write to W. Newman & Co., Ltd., 4, Old Court House Street, Calcutta; A. M. Coleman & Co., 28-29, Chancery Lane, London W.C.2. (6) Gum arabic is 'Arbigond.'

2474 G. V. B., Ujjain—Magic lantern slides may be had of Calcutta Pure Drug Co., 4-1A, Waterloo Street, Calcutta, and Fine Art Cottage, Old Mission School Bldgs., Palton Bazar, Dehra Dun.

2477 B. B., Kishengarh—You may write to Ermen & Roby Ltd., Patricroft, Eccles.

2478 G. K., Chandalur—(1) Sewing yarn may be had of Keshoram Cotton Mills Ltd., 8, Royal

Machinery for the Manufacture of

Chemicals, Powder, Hair Oils, Creams, Perfumes, Pills, Tablets, Drugs, Medicines.
Artificial Ghee, etc. Also:—

Chemical Plant, Oil Mills, Filter Presses, Sugar Mills & Centrifugals, Tin Box Making Machinery, Sterilisers, Laboratory Apparatus, Biscuit and Bread Making Machinery, Laundry Machinery, Tube-filling Machinery, Glycerine Plant, Cream Separators, Fertilisers, Fruit Preserving Machinery, Slate and Stone Working Machinery and Pumps for all purposes.
W. J. ALCOCK & CO., 7, Hastings Street, Calcutta.

Exchange Place, Calcutta and Calico Mills Ltd., Ahmedabad. (2) Eucalyptus oil is manufactured in the Nilgris. (3) Process of manufacturing eucalyptus oil will be found in March 1934 issue of Industry. (4) White oil is mineral oil found in mines.

2486 S. R. R. M., Drug—For machine you may write to Marshall Sons & Co., Ltd. 99, Clive Street, Calcutta.

2487 D. S. J., Kurnool—Following is a list of medical journals: Medical Digest, Morari Gokuldas Market Bldg., No. 51, Bombay 4; Therapeutic Notices, Post Box 88, Bombay; Calcutta Medical Journal, 62, Bowbazar Street, Calcutta; Hahemann, 165, Bowbazar Street, Calcutta; Indian Medical Record, P7, Taltola Avenue, Calcutta; Indian Journal of Medicine, 82-3, Cornwallis Street, Calcutta, and Indian Medical Gazette, 6, Mango Lane, Calcutta.

2488 R. N. B., Bhagalpur City—You may refer your query to Mr. Peary Mohan Bhattacharjee, Agartala, Tipperah.

2491 A. C. D., Jaipur City—(1) Piecergoods may be supplied by Asano Bussan Co., Ltd., Yamoguchi Bldgs., Kawaramachi 2-Chome, Higashiku, Osaka, Japan, and Dai Nippon Basuki Kabusuiiki Kaisha, 30, Azuchimachi 2-Chome, Higashi-ku, Osaka, Japan. (2) Seeds may be had of Fujita Zenbei Shoten, 36, Kyomachibori-dori 2-Chome Nishi-ku, Osaka, Japan. (3) A recipe of fruit salt will be found in February 1935 issue of Industry.

2492 S. S. M., Bombay—Process of making lime juice, lemon squash, orange squash, etc. will be found in August 1935 issue of Industry.

2495 K. K. A., Kamrup—Wants to be put in touch with the suppliers of bakelite. You may dry match splints in hot chamber. Other process you require will appear in an early issue of Industry.

2496 R. L. C. C., Lahore—For securing suitable partner you may advertise in newspapers of Calcutta. Any place in Bihar will suit you.

2499 A. N. D., Jehanabad—(1) Refer your query to the Consul-General for Japan, 26-27, Dalhousie Square, Calcutta, and Information Bureau, Itoh Bldgs, 60, Sannomiyacho, Itchome,

Kobe, Japan. (2) Rubber goods are already being manufactured in India. You may qualify yourself in toy industry, rubber and celluloid industry, etc. (3) Before going to Japan you should make arrangement for your lodging in Japan. Monthly expenditure will not exceed Rs. 100 per month.

2501 H. C., Ambala Cantt—Process you require will appear in an early issue of Industry.

2502 V. S. G., Meerut—(1) You may start candle manufacture on a small scale with Rs. 500. For this you require paraffin which may be had of Burmah Shell Oil Storage & Distributing Co. of India Ltd., Hongkong House, Calcutta. (2) Camphor may be supplied by T. Fujisawa Company, 1, Doshomachi 2-Chome, Higashi-ku, Osaka, Japan.

2503 M. A. S., Mysore—(1) There is no arrangement for training paper manufacture in India. You may however try to be an apprentice in a certain mill in India, but we cannot definitely tell you which mill will take you as an apprentice. You may however communicate direct with paper mills. (2) For training in foreign countries you may write to High Commissioner for India, India House, Aldwych, London W. C. 2.

2504 R. S., Hayingudi—(1) There is no institute in India where cinematography is taught. (2) Cinema machines may be had of Adair Dutt & Co. Ltd., 8, Dalhousie Square, Calcutta, and J. F. Madan & Co. Ltd., 5, Dharamtala Street, Calcutta. (3) You can earn decently if you tour from one place to another. (4) Process of making rose water appeared in December 1934 issue of Industry. (4) There is no institute where watch repairing is taught.

2505 B. G. N., Nagpur—(1) Splitted khesari and matar peas should be powdered and used in making papadams. (2) You may use any quantity and take oil and make a dough. (3) We are not aware of Tomle's essential oil. (4) Cresol is a coaltar derivative which cannot be saponified. It is used in making coaltar soap. (5) To prepare Turkey red oil treat castor oil with 20 p.c. of sulphuric acid of 60° Be by allowing the acid to flow slowly into the oil

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THE ONLY SUPPLIERS IN INDIA OF

COMPOSITION CORKS FOR FOUNTAIN PEN INK POTS, BOOT CREAM BOTTLES, MEDICINAL AND FOR HAIR OIL PHIALS, COMPOSITION POTS FOR OINTMENTS, POWDERS, POMADES, ROUGE, SINDUR, SNUFF, ETC.

Branches: 153/1, RADHABAZAR ST. CALCUTTA. 3, CHUNAM LANE, BOMBAY, 7.



in a thin stream whilst stirring. The oil is contained in a lead lined iron vessel cooled by ice. After standing 2 to 3 hours the mass is gradually diluted under steady stirring by lukewarm soda solution, 28 kilos of crystallised soda being used to 1 kilo of acid. After standing overnight the finished product separates.

2512 S. K., Lahore—Process of making book-binding cloth appears elsewhere in this issue.

2515 A. D., Kathiawar—We cannot vouchsafe any opinion.

2517 V. M. K., Kharepatan—We are not aware of any such book.

2518 R. H. A., Jhadeswar—Following is a formula of baking powder: Bicarbonate of soda 3 parts; tartaric acid 2 parts. Powder the ingredients and thoroughly dry separately by gentle heat. Mix them in a dry place, sift the mixture and at once put into packages. This will yield a good baking powder for raising flour in the preparation of bread and cake.

2519 T. B., Baroda—In making hair curling lotion you should use potassium carbonate and liquor ammonia. You should use hair curling lotion every day when curling hair.

2522 H. C., Hoshiarpur—Process of making turpentine oil will appear in an early issue of Industry.

2525 R. A. R., Giridih—Biscuit making machine may be had of W. J. Alcock & Co., 7, Hastings Street and Industrial Machinery Co., 14, Clive Street; both of Calcutta.

2527 J. A. M., Bangkok—Process of preparing borneol crystal will appear in an early issue of Industry.

2528 L. D. C., Mari—(1) Amla oil prepared according to the process given in our book is not available in the market. You have to prepare the oil yourself. (2) Process of preparing bahera oil is not complete. You may adopt the process described in making amla oil.

2533 J. P. S. R., Sambhal—Process of preparing crystal and white sugar from molasses and cane juice will appear in an early issue of Industry.

2534 M. S., Kamptee—Formulas you require will appear in an early issue of Industry.

2536 K. B. S., Dabhoi—Following is a list of industrial journals: Industrial Britain published by Hogg & Knight, 149, Strand London W. C.; Industries Illustrated published by Mayfair Ltd., 43 & 44, New Bond Street, London W. 1; Journal of Chemical Technology, 32, Shaftesbury Avenue, London W. 1. and Uberssee Post, 1, Solomonstrasse, Leipzig, Germany.

2538 S. K. M., Bombay—(1) It is essentially necessary to keep acquaintance, and in some cases friendship with customers (2) You may consult Indian Dental Directory published by Kailash & Co., Sadar Bazar, Delhi. (3) We are not aware of any such institute. (4) For office equipment, and machines write to Blackwood Blackwood & Co. Ltd., 2, Mangoe Lane, Calcutta, and Kalamazoo Ltd., 1, Fairlie Place, Calcutta. (5) Following are some of correspondence courses; The School of Accountancy 782, Bush House, London W. C. 2 and International Correspondence Schools Ltd., International Bldgs, Kingsway, London W. C. 2. (6) For analysis write to R. V. Briggs, 8B, Lal Bazar Street, Calcutta. (7) No such institute is known to us. (8) Formula of tooth powder will be found in June 1935 issue of Industry. (9) Instead of going hither and thither you should study thoroughly a book on business practice. You may consult Theory and Practice of Business Organisation and Practice by J. C. Mitter published from this office. You may also consult any railway guide book.

2539 B. K., Burhanpur—Process of making ferrogallie paper will appear in an early issue of Industry.

2540 A. R. K., Bombay—First scrape your teeth then use a good tooth paste.

2541 P. S., Lahore—Process of removing stains will appear in an early issue of Industry.

2547 S. H. H., Patna—For photographic plate camera etc. may be had of Calcutta Photographic Stores & Agency Co., 154, Dharamtala Street and Adair Dutt & Co., 8, Dalhousie Square; both of Calcutta.

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Diesel Engines, Flour Mills, Rice Mills, Dal Mills, Generating Sets, Pumping Sets, Hand and Power Pumps, Workshop Machinery, Printing, Paper Cutting, Book Binding Machinery, Braids and Ribbon Making, Soap Making, Electric Motors, Generators, Electric Tools, Welding Plants, Flexible Shafts, Plating Machinery and Materials, and every type of Woodworking and other Industrial Machinery.

BATLIBOI & COMPANY, Engineers,

Forbes St., Fort, Bombay and 4/153, Broadway, Madras.

2548 S. P. M., Peshawar—Your letter has already been replied by post.

2550 R. C. L. D. I. F., Lucknow—(1) Following is a formula of metal polish: Powdered tripoli 3 oz.; tartaric acid 1 dram; powdered pumice $\frac{1}{2}$ oz.; gasoline 14 fl. oz. Shake well and apply with a woollen cloth until the dirt is removed, then polish with chamois. (2) Following is a recipe of mosquito lotion. Oil of pennyroyal 8 oz.; oil of saffron 7 oz.; rectified spirit 4 oz. Mix. To drive off mosquitoes shake the bottle and spray a quantity of the solution with a sprayer.

2552 M. A. Lahore—(1) For embroidery machines write to Singer Sewing Machine Co., 230, Hornby Road, Bombay. (2) For aerograph printing machines write to W. J. Alcock & Co., 7, Hastings Street, Calcutta.

2553 F. R., Sibsagar—Process of manufacturing water pictures will be found in April 1934 issue of Industry under the caption of decalcomania papers.

2554 S. S. N., Mysore City—Before starting the business you should make a list of goods you wish to deal in. Now, try to purchase the articles at cheap rate where available.

2556 K. N. M., Shimoga—(1) Addresses of goods you require will be found in Industry Year Book and Directory published from this Office. (2) Silk goods may be supplied by Anubhai Mayabhai, 4, Burtolla Street, Calcutta; Indian Silk House, 206, Cornwallis Street, Calcutta; and Indian Silk Store, 84, Bowbazar Street, Calcutta. (3) Hosiery goods may be supplied by Ebrahim Allarukha Rahim, 39, Armenian Street, Calcutta; Kalighat Hosiery, P21/3, Lake Road, Calcutta, and Labour Hosiery Factory, 87/1, Talpukher Road, Calcutta. (4) Readymade clothings may be had of East Bengal Society, Ashutosh Bldgs, 87/2, College Street, Calcutta; Kamalalaya, College Street Market, and Bengal Stores, 8A, Chowringhee Place, Calcutta. You may arrange with the dealers to send samples.

2559 K. W. K., Goa—Process of making solid disinfectants will appear in an early issue of Industry.

2565 N. M. M., Nagpur—For books on village industries write to D. B. Taraporevala Sons & Co., Kitab Mahal, Hornby Road, Bombay, and Book Co. Ltd., 4/4A, College Square, Calcutta.

2572 S. K. B., Noapara—Match making machines may be had of Bhowani Engineering Co. Ltd., 56, Gouribari Lane, Calcutta. The party will supply every information regarding match industry.

2574 G. L., Rawalpindi—For iron screw manufacture you may consult a mechanical engineer. Special machines are required for making iron screws.

2576 H. S. S. R., Mungonda—(1) Wants to be put in touch with the dealers in oil cake in Bombay and brokers in Bombay and Calcutta. (2) Purnea is the head quarter of Purnea District. (3) You have to affix postage stamps worth $3\frac{1}{2}$ annas for enveloped letter to Japan and U. S. A. and for Great Britain $2\frac{1}{2}$ annas.

2577 K. A. S. Rajahmundry—(1) Process of making graphite crucibles appeared in the last issue. (2) For selling graphite please write to Indian Graphite Mining Co., 5, Pollock Street, Calcutta.

2583 L. N., Allahabad—Gramophones may be had of C. C. Shaw Ltd., 170, Dharamtala Street, Calcutta; L. C. Saha, 5, Municipal Market West, Calcutta; S. N. Bhattacharya, 5, Dharamtala Street, Calcutta; N. B. Sen & Bros, 11, Esplanade East, Calcutta; Bombay Phone and General Agency, 520-522, Kalbadevi Road, Bombay, and Ganga Phone Talking Machine Co., 432-434, Kalbadevi Road, Bombay.

2585 D. R. P., Poona—For foreign bonds write to Alex Brault, 7/1, Wellesley Place, Calcutta.

2587 A. S. P., Rangoon—Brass wares may be supplied by B. C. Chatterjee & Co., 10 Haripal Lane, Calcutta; Nath's Brass, Santipur, E. B. Ry. and Bharat Metal Industrial Works, 110, Cassipore Road, Calcutta.

2588 P. C. V., Kumbakonam—We are not aware of any such gentleman.

2589 M. M. J., Ujjain—To improve your sales you may appoint canvassers and sales.



Preserve Your Beauty.

An exceptionally beautiful adherent snow of wonderful charm luxuriously perfumed with the fascinating fragrance of the rose flower. Perfume of superfine quality. It perfects the tint and imparts the texture of the skin which is the compelling charm of a perfect complexion.

E. S. PATANWALA, 182, 84, Abdulrehman Street, Bombay

You may also introduce coupon system to popularise your waxes.

2592 R. K. Colombo—For preparing stick composition mix all the ingredients and dip the sticks in the composition.

2593 M. Y. H. A. Karachi—Formulas of plate powder, insect powder, etc. will appear in an early issue of Industry.

2595 M. A. A. Manthachar—(1) You should fix the commission yourself according to the profit made by selling the goods. (2) It is better for a spectacles canvasser to learn something of eye testing and fitting eye glasses. (3) Wants to be put in touch with bubble and its accessories dealers. (4) Brass-ware may be had of Agency Stores, D27-1A, Deonathpura, Benares City, Indian Art and Crafts Museum, Railway Station Road, Moradabad and K. S. Jowher & Sons, Shidhsarai, Moradabad. (5) Silk goods of all sorts are stocked by Indian Silk House, 206, Cornwallis Street, Indian Silk Store, 84, Bow Bazar Street, and Priya Gopal Bishoyi 70, Khenprapatty Street, Calcutta. (6) D. M. C. thread may be had of E. B. Bros. & Co., 58-1, Canning Street, Calcutta, and Lakodar Mullick, 183 Dharamtala Street, Calcutta. (7) Locks are manufactured by Ghose Dass & Co., 41/1, Lock Gate Road, Chittpore, Calcutta; Ganpat Shaw & Co., 97, Harrison Road, Calcutta; Jain Lock Factory, Jain Street, Aligarh, and K. B. Lock Works, Sarai Kutah Aligarh. (8) Wooden toys may be had of Agency Stores, D27-1A, Deonathpura Benares City. (9) Silk saries may be had of Bhagalpur Silk Emporium, Nayabazar, Bhagalpur. (10) Silk cloth may be had of Gaiti Chowdhury, Islampur Chowk, Murshidabad. (11) Vermilion may be had of Davenport Trading Co., 1, Kashi Ghosh Lane, Calcutta. You may use any kind of otto for perfumed vermilion. (12) Following is a formula of panmosala: Coriander seed 1 tola, aniseed 1 tola, nutmeg 1 tola, ajowan 1 tola, seeds of cardamom major 1 tola, chua 1 tola. Fry on an iron pan coriander seed, aniseed and nutmeg. Incorporate the powdered seeds of cardamom major and chua. Now perfume with essence of rose.

2597 U. P., Nagpur—Formula you require will appear in an early issue of Industry.

2600 N. B. D., Calcutta—(1) Prices of preparing office pads will be found in February 1935 issue of Industry. (2) You may consult British Pharmacopoeia to be had of Chakraverty Chatterjee and Co. Ltd., 15, College Square, Calcutta.

2601 K. V. R., Mangalagiri—Kremenz jewellery, may be had of Nihoney Dutt & Co., 80/3, Harrison Road, Calcutta, and Kremenz and Co., Newark, New Jersey, U. S. A.

2603 J. P. B., Calcutta—(1) Specimen letters of mail order business are not available. You may however consult How To Do Business by Letter and Advertisements by C. de. (2) Debt collecting business will not be suitable for you. It is a suitable business for lawyers because in case of doing this business you have to take legal advice every now and then. We are not aware of any book dealing exhaustively with debt collecting. Mr. P. K. Ghosh M.A., B.L., 12/1A, Nagan Chand Dutt Street, Calcutta undertakes collection of debts.

2609 R. Y. S., Ahmedabad—You have some training in weaving line so it is advisable for you to start a weaving factory instead of a knitting factory. We cannot vouchsafe opinion regarding respectability of the firm, moreover we have not heard any complaint of their machine.

2611 S. H. I. S., Aligarh—Following is a list of trade mark agents: Law Morris & Co., Commercial Bldgs., 19, Strand Road; Sen & Co., Post Box No. 10008; and Star Commercial Agency, 10, Collin Street; all of Calcutta.

2612 B. N. V., Sehore—No such institution is known to us.

2614 K. M. R., Peshawar—(1) For stamps write to Stanley Gibbons Ltd., 391, Strand, London W. C. 2. (2) Following is a list of insurance companies: Caledonian American Insurance Company, 102, Maiden Lane, New York City; The California Insurance Company, 915, Montgomery Street, San Francisco, California; and Central Union Insurance Company, 578, Summit Avenue, Jersey City, New Jersey; all of U. S. A.

2618 B. B. G., Tiger Camp—(1) For mirror making apparatus write to Krishna Glass Silvering Works, 51/1, Sree Gopal Mullick Lane,

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CALCUTTA MINERAL SUPPLY CO., LTD.,

31, Jackson Lane, Calcutta.

Suppliers of

SOAP STONE POWDER,
SILICATE OF SODA

AND ALL OTHER RAW MATERIALS
FOR MANUFACTURE OF SOAP.

Calcutta. (2) No Bengali edition of Independent Careers is available.

2621 A. R. A. Sholapur—We have no book on laundry. An article on laundry appeared in February 1933 issue of Industry.

2622 A. B. Bhagalpur—For the machine required enquire of W. J. Alcock & Co, 7, Hastings St, Calcutta.

2623 B. V., Bangalore—Tallow may be had of F. P. Oliver & Co, Post Box 50, G. P. O., Bombay; Varadashah Lard Factory, Triplicane, Madras, and Hall & Co, 11, Elphinstone Circle, Fort, Bombay. Formula of making artificial camphor will appear in an early issue of Industry.

2624 P. K. S. Asansol—Formulas you require will appear in an early issue of Industry.

2629 D. C. S., Bandra—(1) Artists' water colours are made by grinding by means of a glass muller and slab, the respective pigments previously reduced to powder, into a smooth paste with equal parts of isinglass size and gum water. The paste is then compressed into squares as tightly as possible and dried with a very gentle heat. Old crumbling cake colours should be powdered very finely in a biscuit ware mortar sifted through fine muslin and ground up as above, the gum water being omitted. The powders rubbed up with honey to the consistence of cream constitutes moist colours. (2) Process of preparing ethyl chloride appears elsewhere in this issue.

2630 R. V. S. S., Bijapur—Perfumes you require may be had of D. G. Gore, 31, Mangaldas Road, Bombay; Essence Supply Agency, 75/2, Colootola Street, Calcutta; F. N. Sirkar, 37, Canning Street, Calcutta; K. R. Patwardhan, 72, Canning Street, Calcutta; Ghosh Bros, 51, Canning Street, Calcutta, and Paradise Perfumery House, 75, Colootola Street, Calcutta.

2631 R. M. M., Colombo—Fishing nets and hooks may be had of S. Aki & Co, 23, Satsumabori Minaminocho, Nishi-ku, Osaka, Japan, and Ishii Kotaro Honten, Satsumabori Kitonochi, Nishi-ku, Osaka, Japan.

2632 G. H. G., Patgram—Indian Sugar Industry by S. M. Hadi may be had of the author at Bhopal State.

2636 S. P. D. R., Satamkulam—(1) Following is a recipe of depilatory powder: Barium sulphide 1 to 3 parts; wheat starch 3 parts. When required make into a cream with water, spread on the part, let it remain five or ten minutes, then remove with a blunt knife. (2) Following is a recipe of liquid depilatory: Sodium sulphide 7 per cent; glycerin 10 per cent; water 80.5 p.c.; alcohol 2 p.c.; perfume 0.5 p.c. Dissolve the sodium sulphide in some of the water, add the glycerin and mix. Add the remainder of the water and finally the per-

fume dissolved in the alcohol, mix well and filter. The strength of this depilatory can be increased by increasing the percentage of sodium sulphide but in no case should it exceed 10 per cent.

2637 M. M. S., Ambala City—(1) Scarlet dye is a kind of dye used in making taral alta. This may be had of Fuzle Hossain & Bros., 44, Armenian Street, Calcutta, (2) Taral alta may be had of D. N. Bhattacharjee & Co., 33, Canning Street, Calcutta. (3) We cannot suggest anything without seeing the sample of soap. (4) Sal-soda is washing soda.

2639 A. S., Dacca—(1) Yes you may manufacture salt in some places of Bengal such as Midnapur. Noakhali, Barisal and 24 Perganas districts. (2) Refer your query to the Commissioner of Excise, and Salt, Collectorate Office, Calcutta. (3) You have to invest at least Rs. 100,000 for manufacturing salt on commercial scale (4) For securing expert you may advertise in daily papers of Calcutta (5) The expert will advise you on other points you require.

2640 R. H., Sialkot City—We are not aware of any firm importing such machine. (2) Wants to be put in touch with the suppliers of very thin glazed and coloured rubber sheets. (3) Process of manufacturing tartaric acid will be found in Chemical Industries of India published from this Office.

2641 C. C. W. Nagpur—You may write to Standard Literature Co. Ltd., 13/1, Old Court House Street, Calcutta for purchasing books on instalment system.

2645 S. M., Kishangarh—(1) Brass sheet may be supplied by The Japan Copper Refining Co. 24, Tenjimbashisuy, 4-Chome, Kitaku, C. Japan and Sakane & Co, 8, Suyeyoshibashido, 2-Chome, Minamiku, Osaka, Japan. (2) Col-

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Wholesale Importers
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Perfumes, Oil colours,
all sorts of Perfumery
Materials, required for
Fumts Soap Makers, A
bathi Manufacturers,
etc.

Prices and other Part
on Application.

may be supplied by Gebr. Heitmann, Koln, a Rh, Germany and G. Siegel & Co. G.m.b.H. Stuttgart 10, Germany

2652 M. V. M. K. C., Batticalowa—Replies of questions are generally published in our journals. For post reply each question should be accompanied by 4 as stamps.

2655 M. B. R., Penang—(1) Picture post cards may be had of Calcutta Commercial Bureau, Kalighat, Calcutta. (2) For Ayurvedic books in English write to N. N. Sen & Co. Ltd., 18 & 19, Lower Chitpur Road, Calcutta.

2656 T. C. M., Karachi—(1) An article on dry cell making will be found in May 1934 issue of Industry. (2) Other processes you require will appear in an early issue of Industry.

2660 S. N. S., Sholapur—An article on mantle manufacture appeared in June 1933 issue of Industry.

2664 E. D. F., Ahmedabad—For engraving equipment write to Bombay Hardware Mart, 82, Clive Street, Calcutta.

2666 G. H. H. P., Coorg—(1) Vernacular equivalent of longifolium ochrocarpus is not available. (2) Hedyotis auricularia is known as gatta-collo in Cinchalese. (2) For the type required enquire of John Dickinson & Co. Ltd., 21, Old Court House Street, Calcutta. (3) For quinine, cinchona, etc., write to Government Cinchona Plantations, Kalimpong, Bengal. (4) Edible oil colours may be had of Fuzlehussain & Bros., 44, Armenian Street, Calcutta. (5) A formula of varnish for book binding cloth will be found in November 1935 issue of Industry. (6) Embossing dies are made by the process of engraving. (7) For books on process engraving write to Gujrat Type Foundry, Gaiwadi, Girgaon, Bombay. (8) Process of producing glass in printing ink will be found in October 1935 issue of Industry.

2667 S. V. B., Thodupuzha—Following is the process of manufacturing ginger preserve: Grate one ounce of ginger, and put it with a pound of refined sugar beaten fine, into a tossing pan with water to dissolve it. Stir well together over a slow fire till the sugar is thick. Then take it off the fire, drop it into cakes, upon earthen dishes, set them in a warm place to dry; these will be brittle, and look white.

2670 K. N. M., Shimoga—(1) Yes you may take up the career of a travelling agent or manufacturer's representative. There is much prospect in this line. (2) Hosiery goods may be had of Rai Bahadur Knitting Works, Ludhiana; Ravi Knitting Mills, Ludhiana; and Gupta Hosiery Co Ltd, Ludhiana. (3) Cloths may be had of Victory Works, Ludhiana; Khwaja National Factory, Ludhiana; Calcutta Textiles, Cannanore, Malabar; Commonwealth Weaving Factory, Cannanore, Malabar; Bali & Sons, Chowk, Amirakadal, Srinagar, Kashmir. Other addresses you require will be found in Industry Year Book & Directory published from this Office. (4) Sewing machine is manufactured in India but efficiency of which is not yet known. (5) You may start business of manufacturing sewing machines with Rs. 20,000. (6) We are not aware of any institution where training in cinema industry is given. (7) You may however communicate with cinema film producers enquiring whether they can take you as an apprentice.

2673 G. H. A., Rawalpindi—Refer your queries to The Imperial Chemical Industries (India) Ltd., 18, Strand Road, Calcutta.

2675 K. L. B., Sialkot—In making rubber solution you may use para rubber (unvulcanised rubber). Carbon disulphide is volatile liquid chemical used in dissolving rubber.

2676 A. R. P., Hyderabad—Before starting any industry you study the local market, raw materials available, fuel available, etc. If there be any wholesale market in the neighbourhood it would help disposing of the production.

2677 M. G. L., Salem—Process of making French polish appears elsewhere in this issue.

2678 G. S. A., Palghat—Ingredients you require may be had of Paradise Perfumery House, 75, Colootola Street, Calcutta, and Sikri & Co., 55, Canning Street, Calcutta.

2682 S. N. A. C., Muktagacha—There is no arrangement for training students in confectionery and bakery. You may however try to be an apprentice in a confectionery and bakery factory.

Chemicals for

MATCH WORKS.
RUBBER WORKS.
GLASS WORKS.
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17-19, R. G. KAR Road, P.O. Shambazar,
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A radical cure for RING-
WORM and all sorts of
Skin diseases.

Price 1 oz. As. 0-6-0
" 4 oz. Rs. 1-4-0

Postage Extra.

SAPAT & CO., (I),
Bombay 2.

2684 S. K. M., Bombay—(1) For selection of block you may consult any artist (2) You have to pay 10 % of the cost more for non-standard package quantity (3) You have to bear the freight, insurance and other charges in addition to actual price. (4) Yes, import duty varies on different articles (5) The address of General Insurance Co., of America is 1200 Henry Bldg. Seattle, Washington, U. S. A. (6) No such institution is known to us. (7) Procedure of import business will be found in November 1935 issue of Industry in Reader's Business Problems section (8) Refer your query to the Indian Broadcasting Co. Ltd. Garstin Place, Calcutta (9) You will find collection of model letters in any good book on commercial letter writing. (10) The form of signature quoted by you is correct (11) Your friend can himself select any name. In business it is not name but service which count for success. Always be careful in giving good service for the remuneration you get.

2687 S. M. R., Koppakadur—Keep the solution after preparation for a week and strain through fine linen if there be any sediment. Apply the solution to the record with a sponge.

2688 B. D. H., Bombay—(1) Waste celluloid films may be had of J. F. Madan & Co. Ltd., 5, Dharamtala Street, Calcutta. (2) The chemicals you require may be had of B. K. Paul & Co., Ltd., 1 & 3, Bonfields Lane, Calcutta.

2689 R. S., Lahore—No such institute is known to us. You may however try to be an apprentice or an assistant in a firm dealing in sanitary goods.

2690 K. P. B., Lucknow—Cookers may be supplied by E. H. Stafford Mfg. Co., Chicago, Illinois, U. S. A. and Cookers & Geysers Ltd., 244, High Holborn, London W. C. 1.

2691 R. P., Vellore—Process of manufacturing printing varnish will appear in an early issue of Industry.

2692 M. Z., Nagpur City—Process of preparing varnish will appear in an early issue of Industry.

2695 C. N., Ambala City—Following is a list of motor accessories dealers: Bulsar Motor Stores, Vallabhdas Kanji Bldgs., 177-A Princess

Street, Bombay; Rane Ltd., Queens Road, Bombay, Calcutta Automobile Stores, 43 Bentinck Street, Calcutta; Howrah Motor Co., Norton Bldgs., Lall Bazar, Calcutta; Punjab Motor Stores, 20, Ashutosh Mukherjee Road, Calcutta, and S. C. Khanna & Co., 79/26D, Lower Circular Road, Calcutta.

2696 M. D. J., Nawashah—Fish oil may be had of Baikuntha Nath Sarat Chandra Chakraverty, 5, Nawab Lane, Barrabazar, Calcutta.

2698 S. R. P., Paramakudi—Formulas you require will appear in an early issue of Industry.

2700 T. S., Amritsar—Process of bleaching hair will be found in October 1935 issue of Industry. For books on industrial subjects write to W. Newman & Co. Ltd., 3 & 4, Old Court House Street, Calcutta, and D. B. Taraporevala Sons & Co., Kitab Mahal, Hornby Road, Fort, Bombay.

2701 B. R. K., Amritsar—We cannot vouchsafe opinion regarding respectability of any firm.

2705 W. D., Ghaziabad—(1) Price of soap depends upon the price of raw materials required such as oils, caustic soda, sodium silicate, etc. so without knowing the prices of raw materials it is not possible to supply you a formula of cheap soap. You may however try any formula of full boiled soap. (2) To prepare ink tablets from ink powder and dyes the colours are thoroughly powdered and mixed with starch, gum, dextrine, etc., which are also finely powdered. The powders thus formed may be converted into tablets by means of a compressing machine commonly known as a tablet making machine. Following is a recipe of blue-black ink powder: Logwood extract 100 parts, potassium chromate 1 part; gum 10 parts; indigo carmine 20 parts. Mix in fine powder and press into tablets. Following is a formula of red ink powder. Eosin 8 parts, dextrine 4 parts; sugar 8 parts. Mix the ingredients and press into tablets.

2709 M. R. S., Panruti—(1) Following is a recipe of liquid depilatory. Sodium sulphide 7 per cent; glycerin 10 per cent; water 80.5 per cent; alcohol 2 per cent; perfume 0.5 per cent.

CELOTEX

WHAT IT IS AND DOES

SEE PAGE 619.

Tannery Co Ltd, Canal South Road, Pagladanga, Calcutta and Cawnpore Tannery Co, Beconganj, Cawnpore

2761 T. M. Mehgaon—(1) Iron and brass hinges making machine may be supplied by Taylor & Challen Ltd, Birmingham, England (2) Wood screw and wire nail making machinery may be had of Ludwig Loewe & Co, A-G, Berlin and J. G. Kayser A-G, Maschinenfabrik, Nurnberg-Glauchhammer, both of Germany (3) Hosiery machine may be had of Indo-Swiss Trading Co. Ltd, 2, Church Lane, Calcutta

2765 L. D. S. Kandana—Potassium nitrate is not used in making head composition for match stick. Potassium chlorate is used instead

2766 B. K. B., Kymore—The process you require will appear in an early issue of Industry

2767 M. O. Lashio—Rubber balloons are filled with hydrogen gas. For apparatus write to Bengal Chemical & Pharmaceutical Works Ltd, 31, Chittaranjan Avenue, Calcutta

2768 M. H., Bombay—For diatomite earth write to Hercurt Butler Technological Institute, Cawnpore. There is nothing known as odourless powder.

2769 O. R. C. L., Howrah—Fibre of carica papaya has no commercial value

2777 M. K. A., Tellicherry—(1) If electric current is available in your place you may use a dynamo for an electroplating work. But if electric current is not available you should use cell. Four Daniel cells connected in series will produce enough current required for electroplating large articles. (2) Electroplating equipment may be had of S Mitra & Co., 30, Bentinck Street, Calcutta (3) You may use any type of dynamo but you have to connect a rehostat for regulating the current. (4) Candle power depends on amperage and not on voltage. (5) Lamps mentioned by you give different kind of light. Petromax lamps give more light than acetylene gas lamps. For all kinds of lamps write to K. C. Dey & Sons, 96, Lower Chitpore Road, Calcutta (6) Accumulator is storage battery while a battery is a primary cell. (7) Rope making machines may be had of Mitsubishi Shoji Kaisha Ltd, 135, Canning Street, Calcutta

2778 I. A. C. A., Nagercoil—Process of decolorising horn will appear in an early issue of Industry.

2779 P. W., Jhelum—To communicate with any querist write to him with number and initials under care of Industry when your letters will be duly redirected. For selling plaster of Paris you may negotiate with Calcutta Mineral Supply Agency Ltd., 31, Jackson Lane, Calcutta.

2780 S. L. J., Ahmedabad—If you go through Industry you will get many business ideas in it. You may select any one according to your liking. Then if you require further instruction we shall gladly supply you.

2782 P. A. R. B., Tirur—Process of block making will be found in Independent Careers for the Young published from this Office.

2784 R. S. S. C., Kyungon—(1) Refer your query to Yoga Institute, Post Box 481, Bombay. (2) For learning hypnotism you may communicate Prof. Rudra, Alamnagar, Rangpur, E. B. Ry.

2785 G. L., Chauk—Refer your query to A. N. Sayal, B.A., Ludhiana, Punjab.

2786 T. R., Ganjam—Bottles, corks and labels may be had of Shah & Co., 55, Ezra Street and Sikri & Co., 55, Canning Street; both of Calcutta.

2787 M. F., Jharsuguda—(1) Following is a formula of scented catechu: Take 2 seers of Rangoon khair and 3 seers of Janakpuri khair, Soak them in water in a vessel. Mix 4 tola of pollen of keora flower. Macerate 1/16 tola musk in 1 tola rose water and add to the paste. Then incorporate Kashmiri saffron 2 tola, bruised cardamom seed 5 tola. Work the paste thoroughly and dry in the sun. (2) Process of manufacturing other kinds of catechu will be found in Manufacture of Catechu published from this Office (3) It is not possible to manufacture aniline colour on a small scale. (4) Process of preparing hair cream will be found in September 1935 issue of Industry. (5) In making vinegar molasses (ordinary gur) is used. (6) Process of making solder for aluminium will be found in March 1935 issue of Industry. (7) January 1935 issue of Industry contains a formula of disinfectant fluid

2788 H. P., Colombo—Chemicals may be had of Buttokristo Paul & Co, Ltd., 1 & 2

G. Dey & Co.,

Suppliers of Stationery to the Government of India and Corporation of Calcutta, etc. Rubber Stamp Makers, Die-Sinkers, etc., etc. General Order Suppliers. Quote for your esteemed enquiries and hope we shall be able to please you.

13, Satrugna Ghose Lane, Calcutta.
Telephone—B. B. 1735.

SETT DEY & Co

ORIGINAL HOMEOPATHIC PHARMACISTS,
40-A, Strand Road, Calcutta.

Dealers in Original Homeopathic Dilutions and Biochemic Triturations.

Catalogue Free on Application.

Bonfields Lane, Calcutta, and Calcutta Mineral Supply Agency Ltd, 31, Jackson Lane, Calcutta

2791 S. S., Calcutta—(1) Japanese machines may be had of Mitsubishi Soji Kaisha Ltd., 135, Canning Street, Calcutta. (2) You may consult Japan Chronicle, Kobe, Japan.

2792 M. A. S., Siqua—You may start a soap factory with Rs. 1000. This business will be profitable in your place. In this connection you may consult Manufacture of Soap published from this Office. There is no institute which teaches hosiery, button and match industries. You may however write to College of Industry & Trade, 144, Dharamtala Street, Calcutta.

2793 K. S. S., Lahore—(1) You may start biri making with Rs. 5. (2) Japanese goods may be had of Ahmed Abdul Karim Bros. Ltd, 9, Zakaria Street, Calcutta. (3) For lottery tickets write to Royal Calcutta Turf Club, 11, Russel Street, Calcutta.

2794 M. A. A., Bareilly—Printing types may be had of Agarwal Type Foundry, 83, Pandariba, Allahabad; Bhargava Type Foundry, Ram Bhavan, Bai-ka-bagh, Allahabad, and Lakshmi Type Foundry, Bai-ka-bagh, Allahabad

2795 W. M. J., Nigeria—Your query is unintelligible.

2796 D. N. S., Jammu Tawi—(1) There is no institution in India where sound recording is taught. (2) Your brother may start a shop dealing in all sorts of curios and local goods.

2797 S. D. G., Poona City—Picture post cards may be supplied by J. Beagles & Co. Ltd, 9, Little Britain, London E. C.; E. T. W. Dennis & Sons Ltd., Scarborough Fischer & Wittig, 12, Teubner Str., Leipzig C1, Germany, and Herrmann Ernst, 31, Gohliser Str., Dresden 28, Germany.

2798 J. D. M. F., Rangoon—For rubber balloon making machine write to Troester Paul, Hannover—Wulfel Germany, and A. Schimdt Walter, Leipzig W. 33, Germany.



Togal

Sure Relief for Gout, Lumbago, Sciatica, Rheumatism, Malaria, Nerve Pains. Unfailing remedy, 6000 medical certificates. From all Druggists. Free literature and samples from the General Agents.

F. STAHELI & CO.,
Post Box 2074, Calcutta.

2799 G. J., Repalle—(1) For fire clay boxes write to Burn & Co., 12, Mission Row, Calcutta. You better consult an expert. (2) Natural essence extracted through the medium of water should be used immediately after preparation otherwise these will be decomposed.

2800 D. S. R., Palakole—(1) All the ingredients you require may be had of Banshidhar Dutt & Sons, 126, Khengrapatty, Barrabazar, Calcutta. (2) Formulas of fountain pen ink will be found in August 1934 issue of Industry. Ingredients you require may be had of Butto Kristo Paul & Co. Ltd., 1 & 3, Bonfields Lane, Calcutta.

2801 B. M. S., Kohat Cantt—Process of softening water will appear in an early issue of Industry.

2802 G. C. D. A., Kandy—Archill may be had of Fuzlehussain & Bros., 44, Armenian Street, Calcutta.

2803 R. C. R., Lahore—An article on carbon paper and typewriter ribbon making appeared in March 1934 issue of Industry. For machines you may enquire of W. J. Alcock & Co., 7, Hastings Street, Calcutta. Other ingredients may be had of any big stationers

2804 B. G. N., Nagpur—(1) In a jockey club only jockeys are eligible for membership. (2) Water black is a dye. (3) To prepare battery solution of specific gravity 1.2 take chemically pure sulphuric acid 5 gallons and dilute it with 16 gallons of distilled water. In diluting the acid great care is required owing to the dangerous properties of the acid and the great heat developed by its combination with water. The acid should be poured slowly into the water in a lead-lined tank and well stirred by a wooden rod. (4) In order to test complete saponification see that the mass assumes the consistency of honey without any greasiness. (5) Defect of the disinfecting fluid is due to the fact that the whole has not been emulsified. (6) It is not possible to find out carbolic coefficient without bacteriological analysis.

2807 R. S., Moradabad—Sheet metal working machine may be had of Francis & Klein, 1 Royal Exchange Place, Calcutta, and W. J. Alcock & Co., 7, Hastings Street, Calcutta.

2809 A. V. R., Gudivada—Formulas you require will appear in an early issue of Industry.

2810 M. S. Y. C., Amritsar—(1) It is not possible to keep coconut oil in liquid state in winter except by mixing other oil with it. (2) You should use some fixing agent such as musk, ambergris, civet, etc., to keep perfume in hair oil. (3) Process of purifying oil will be found in Indian Perfumes, Essences and Hair Oils which you have already got.

INDIAN PUMP COMPANY.

We had recently the pleasure to pay a visit to the factory of Indian Pump Company. It is located at 8, Anwar Shah Road, Tollkunge, a growing suburb of Calcutta. We were much impressed by the high quality of work turned out in the factory. An agreeable surprise however awaited us during our inspection. From the name of the factory we were led to believe, of course through no fault of ours, that the company was simply concerned with the manufacture of pumps. But in fact the activities of the Company are not confined to the making of pumps only. They also specialise in a good number of articles such as collapsible gates, wrought iron gates and grills, stair case, railings, camera cranes, centrifugal machines, boilers for chemical purposes, etc. The gates, grills etc are made to the design of their customers and bear monograms of any metal on their body. The company also makes structural works of all descriptions.

We examined the pumps which were of all descriptions. They may be employed to draw water from any depth or to force water to a height of 60 ft. It is understood that the various troubles met in the working of ordinary pumps have been eliminated. The pumps are all steel requiring no leather valves or check valves which frequently run out of order resulting in most inconvenient stoppage of water supply.

The proprietors of the company took us round the factory and explained the processes of manufacture for which they deserve our best thanks.

CELOTEX—WHAT IT IS AND DOES.

Celotex is an inexpensive lightweight building material made of sugar-cane fibres by a continuous process of felting the tough fibres of the cane into a broad board. It has incorporated within it myriads of minute air cells which contribute insulation against the passage of heat or cold when used on the interior of buildings.

Scientific experiments by practical laboratories of Great Britain and America have determined that $\frac{1}{2}$ inch of Celotex has the same insulating value as 12 inches of wood, 4 inches of asbestos cement board or plasterboard, 8 inches of bricks, and 13 inches of concrete.

Celotex offers advantages for construction, alteration, repair, and beautiful finish never before combined in any building material. It provides insulation, builds stronger, keeps out dampness, wind and dust, and quiets sound. Celotex is suitable for new or remodelled buildings, lining damp walls and corrugated iron

roofs, partitions, garages, country and workmen's houses, construction offices, etc. Because of its neutral colour and interesting texture, it is never necessary to apply any decoration to Celotex walls and ceilings, although it may be painted, sawed and handled like ordinary timber if desired.

Most construction materials are subject to natural agencies of decay. The results of Dry Rot are familiar to almost everyone. Another enemy to building materials—White Ants—feed on cellulose with such ferocity as to weaken structures to a point of collapse with incredible rapidity. The Ferox Process (Patented) used in the manufacture of Celotex is the result of ten years' continuous research. It is an integral—not a surface—treatment and effectively protects all Celotex Cane Fibre products from damage by Dry Rot, Fungus Growth and White Ants.

Celotex is available from Messrs Shaw Wallace & Co Bankshall Street, Calcutta, to whom all enquiries should be addressed.

SWEDISH PRODUCTS.

It is gratifying to learn that the robustly constructed, reliable and inexpensive Original-Odhner calculating machines are now available in India. These easy to operate machines will solve two of the greatest difficulties that have in the past, proved bug-bears to the use of calculating machines in this country; namely, the employment of specially trained operators, and devices that unnecessarily complicate the machine and add considerably to the cost. Particulars of these machines, also Swing Safety Razors and Blades, manufactured by the largest razor blade factory in Scandinavia and one of the most up-to-date in the world, may be had on application to The Vulcan Trading Co. British Indian Street, Calcutta—Nicol Road, Bombay—Washermanpeth, Madras—Bunder Road, Karachi, and Merchant Street, Rangoon.

TOGAL.

Rheumatic pains, gout and similar ailments are due to a faulty composition of the blood. Togonal tablets prevent the accumulation of uric acid and causes increased elimination of the unwholesome blood-substances.

Due to excellent results obtained by more than 6,000 medical men, among them, the leading authorities, in cases of Rheumatism, Sciatica, Lumbago, Gout, Headaches, Colds, there is only one opinion about Togonal, namely that it acts where other preparations fail. The tablets are perfectly harmless and can be taken for any length of time. A liberal trial may be had on application to Messrs. F. S. & Co., 8, Old Court House Corner, Calcutta.

REVIEW OF BOOKS

PRINCIPLES OF ECONOMIC PLANNING. By G. D. H. Cole. Macmillan & Co., Ltd., St. Martin's Street, London. 1935. PP. 435, price 6s. net.

This is one of the series of recent mass productions of Mr. Cole in publication. Here the author gives his analysis of the principles of economic planning. The method is rational induction from the data supplied by recent economic experiences, rather than deduction from the existing theories. These are not principles in general, as the author himself admits that there cannot be any such principles if they are not to be superficial. Co-ordination of economic structure involves bringing it in order with political structure which has assumed different forms in different countries. The author has therefore modelled his principles to suit the political system of Great Britain. Naturally, his suggestions do not presuppose any revolution to upset and remodel the social structure of the country. With this connotation of the principles of economic planning Mr. Cole has produced a very good readable book where he has evinced his grip over the events in Great Britain and elsewhere. In his analysis of them he has applied common-sense reasoning and has avoided all technical approaches. He has not however been able to get rid of his established faith in socialism whereupon he presents his analysis in two well-demarcated lines: planning under capitalism and planning under socialism. Where he presents the existing nature of organisation of British trade, industry and agriculture and suggests reform from these two contrasted viewpoints, the reading is highly interesting. But one wonders at least that greater stress has been laid on productive aspects than on distributive. The author's aim for the control of production does not go far ahead. It is to eliminate unemployment, a problem pressing so heavily upon Great Britain, and raise the standard of living of the working class. An ultimate 'co-ordination of supply with demand has not received that amount of emphasis which it deserves. It has therefore been possible on the part of the author to indulge in such contradictions as that the object of a plan is to unloose the productive energy and not to restrict it although he admits in the same breath that it is to meet the needs of to-day. No economist can afford to overlook the elasticity of needs and production and the difficulty of establishing equilibrium between them, conscious or unconscious, without harm-

ing the interest of the one or the other at points beyond. Mr. Cole has groped at length in order to reconcile planning of home production with regulation of foreign trade while retaining at the same time the benefits of free trade; and he has found in the public monopoly of import a solution. To sum up, the author wants to substitute the existing divided bureaucracy in business organisation by an autonomous economic democracy comprehending the whole field of national economy to work side by side and along with but not far away from the structure of political self-government. The publication is mainly to serve the time and the present generation rather than to establish any far-reaching principle.

P. Datta.

DECAY OF INDIAN INDUSTRIES. By P. R. Ramachandra Rao. Published by D. B. Taraporevala & Co., Treasure House of Books, Hornby Road, Fort, Bombay. Pages 155, price Rs. 2/-.

The developments in the industrial line in ancient India awakened wide interest all round the world. Glowing tributes have been paid by eminent scholars and travellers to the achievements of the Indians in the days gone by. Not only the Indian labour were applauded for their skill in handicrafts but also for their ingenuity in the conception of the design. The Indian traders were also adventurous in spirit sending their cotton and silk, shawls and carpets, iron and glass to far off countries in their own ships. On this background of fancifully variegated colour Mr. Rao traces how the shadows of industrial decay spread all over India, once in great prosperity. The rot set in towards the middle of the seventeenth century with the abolition of native courts when the craftsmen were harnessed to the spiritless lot of mere wage earners to the benefit of the middleman or the capitalist. There was scarcely any differentiation and preference for artistic labour due to standardised wages. But ruin of Indian trades and industries may however be directly attributed to the trade concessions granted by the Moghul Emperor to foreign merchants. This intensified struggle for commercial supremacy which ended in the subversion of the Moghul Empire and Indian industries. The subsequent impost of inland duties, harassing of Indian craftsmen, preferential duties on foreign goods, advent of machines and free trade, spelt disaster for Indian industries. Mr. Rao

quotes freely from eminent authors to state the conditions of the craftsmen under the new environments and discusses in detail with the various causes which led to the ruin of the old industries. When India is seeking to regenerate the dyeing industries, it is only proper that she should pay proper attention to the understanding of the causes which induced it. The book is written in a lucid style and is very illuminating. It also enquires about the prospects of cottage industries in these days and lays great importance to the newly formed association styled "All-India Village Industries Association," as a step taken in the right direction.

HOW TO UNDERSTAND ELECTRICITY.

By A. Frederick Collins. Published by J. B. Lippincott Company, 16, John Street, Adelphi, London W.C.2. Pages 326, price 10s. 6d.

Electricity is the greatest domestic and industrial power that has been harnessed by man. It is employed for every conceivable sort of business—breaking up of an atom to driving a locomotive. The principles of electricity—what it is and how it acts—are enigmas to the uninitiated in the physical sciences. The book under review seeks to explain the various electrical phenomena in a simple language to be clearly understood even by all beginners. Mr. Collins who has already won a reputation as the author of the *New World of Science* is to be congratulated on his fine success in presenting intricate facts of electricity in a popular manner. The book starts with how Magnetism and Electricity got their names and proceeds with the explanation of Magnetic Induction and phenomenon connected with static or current electricity. There are descriptions of making primary cells and storage cells, dynamo, etc. Uses of electroplating, electro-chemistry, electro-magnetic induction, alternating current, etc. have been explained clearly. The book will be highly interesting to those who want to have a fair knowledge of what electricity is. There are 158 illustrations and diagrams which enhance the value of the book.

HOW TO ENTER THE FILM WORLD

By E. G. Cousins. Published by George Allen and Unwin Ltd., 40, Museum Street, London W.C.1. Pages 105, price 2s.

The film industry offers attraction to many. The people who want to enter the film world may be roughly divided into three main classes: there are those who want to Act, there are the scientists, tradesmen, mechanics, craftsmen, cameramen, sound recorders, artists, etc. and there are the people who want to direct films and write stories.

The book coming from the pen of one having large experience in the line offers a number of suggestions which will be greatly helpful to all and disillusion many who are too sure about their glorious future. The qualifications that would-be actors will find essential for their successful career are not one or two but many. These include not only the possession of a good physique, good looks, clear complexion, well-tended hair, easy carriage, good voice free from provincialism but also acquisition of various accomplishments such as riding, driving, dancing, swimming, singing, playing musical instruments, etc. Above all he is required to possess a large fund of determination, intelligence, pliability, personality and charm. The author then narrates how the three classes of people can enter this wonderland. The book is highly interesting and depicts the life in and behind a studio.

SKINNER'S COTTON TRADE DIRECTORY OF THE WORLD, 1935-36.

Published by Thomas Skinner & Co., 330, Gresham House, Old Broad Street, London, E.C.2. Pages 942, price 20s.

We have received a complimentary copy of the thirteenth issue of Skinner's Cotton Trade Directory, a work of reference of the Cotton Industry of the world. It embodies extensive revision of details, in collaboration with the leading textile associations throughout the world, and valuable additions have been made to the particulars previously published. In view of the increasing use of "Rayon Staple Fibre," a list of companies handling this product has been included in the silk and rayon section. The hosiery and knit goods manufacturers section has been considerably augmented, and wherever possible the type of machines used and the articles manufactured have been indicated. The trade names of articles manufactured by many firms and companies in this section are also given.

The book teems with information on the cotton industry in the world specially in Great Britain. It is arranged in a convenient manner for ready reference.

YEAR BOOK OF AGRICULTURE, 1935.

Edited by Milton S. Eisenhower. Published by the Department of Agriculture, Washington, United States. Pages 762.

With the inauguration of the New Deal in 1933, a many-sided programme has been set in motion by the United States. Recent applications under the new Agricultural Adjustment Act for the regulation of the crops according to the needs of the land have been highly suc-

cessful. Its objective is not simple restriction of cotton, wheat, tobacco and hop crops but regulation of production to a stable or rising demand in order to restore agricultural prices to their fair relationship with other prices and to continue such adjustment as will maintain that balance. This has brought prices to the farmer a long way back towards parity without in any way curtailing domestic consumption.

The Year Book records the experiments made by the various branches under the Department of Agriculture for increasing the production of the agricultural crops. The results and processes evolved in agricultural industries have also received due attention. The problems of distribution and consumption have been adequately treated as it is now considered that production is useless unless backed up by a sound system of distribution. The Year Book also compiles various agricultural statistics about grains, cotton, sugar, tobacco, cattle, poultry, etc. etc. The book will be of great service to those who intend to have up-to-date information about American agriculture.

KINEMATOGRAPH YEAR BOOK 1935.

Published by Kinematograph Publications Ltd, 93, Long Acre, London W. C. 2. Pages 624, price 10 s.

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The film industry is one of the firmly established industries in the world, specially so in the United States, England, Germany, Austria, etc. It has its appeal to persons of all nationalities. The industry has new problems to tackle from year to year. The Year Book under review depicts the present situation of the film industry in the important centres of production. The modern tendencies in evidence among the cinema producers and distributors have been dealt with from first hand knowledge. The book opens with an account showing the worries and anxieties, ambitions and achievements, competition and booking during the year just closed. After a general narration comes a survey of the film industry in the individual countries which count in the film world. Then follows an Overseas Trade Directory giving a list of film producers and distributors in the different countries of the world. There is also a list of Films shown in 1934 with the name of producers and principal artists. A digest of the Acts and Regulations governing the cinema show houses has been supplied. There are also lists of trade organisations, kinemas in London, England, Scotland etc., an important Who's what in the studio, etc. There are in fact all sorts of information in the cinema line, the competition and recent technique.

WHAT IS PATRIOTISM? Edited by N. P. Macdonald. Published by Thornton Butterworth Ltd., 15, Bedford Street, London W.C. 2. Pages 312, price 7s. 6d.

There are certain words in common parlance, the true concept of which is clouded in much speculation. One of them is patriotism. Great minds have agreed to differ on the types of idealism the word would stand for. Mr. Macdonald, the editor of this book, has therefore done well to collect the interpretations which the Philosophers, Economists, Clergymen, Politicians, Scientists, Historians; Educationists attach to this much vaunted word patriotism.

The book under review is a handy symposium on the meaning of what patriotism is from eminent persons of all schools of thought. It includes articles from Sir Basil Blackett, Sir Charles Patrie, Lt.-Col. Sir Arnold Wilson, Rt.-Hon. Lord Davies, Dr. A. M. Low, Lady Cynthia Asquith and others. The book thus compiles views on the word from all aspects, domestic, national and international. We hope with the author that these will clear away the misunderstandings that have collected about it and will remove the ivy so that the wall in all its ruggedness and strength may the better be seen and the purpose it stands for the better understood.

GITA-RAHASYA, Vol. I. By B. G. Tilak.

Translated into English by B. S. Suthankar, M.A., LL.B., Published by R. B. Tilak, 568, Narayan Peth, Poona. Page 618, Price Rs. 6/-.

The Gita—the Song of the Lord is an outstanding work on the philosophy of Indian life, ethics and religion. Enshrined in 700 slokas it contains the quintessence of the Upanishads and the six systems of philosophy. It stands out pre-eminent through the veil of ages. There are any number of commentaries on this work, throwing a flood of life on the inner meaning of the teachings.

The book under review from the pen of Lokamanya Tilak, the prince of patriots, offers a brilliant exposition on the dogmas and tenets of the Gita. It does not proceed verse after verse but explains the whole Gita in the course of a number of chapters. His views are substantiated by quotations from the Shastras. The original book was published in Marathi in 1916. The erudite scholarship which Mr. Tilak brought to bear in expounding the canons of Karma-yoga at once arrested the attention of all. It has since been translated in Hindi, Gujarati, Bengali, Kenarese, Telugu and Tamil. Mr. Suthankar has not been a day too soon in rendering it in English thus bringing it to the view of the English knowing people. The translation is ably done and should be widely read.

NOTICES & REVIEWS.

[Manufacturers sending specimens and samples of their products for notice and review may please note that no notice is published of medicinal preparations and allied substances in this section.]

Agarbatti.

We acknowledge with thanks a box containing 100 sticks of agarbatti from Mysore Agarbatti Co., Bangalore City. The article appears to be good.

Japan Directory.

We have received from Messrs Sinha & Sons, Sinha Buildings, Gourakund, Indore City, a copy of Japan-Directory (Second edition). The book is thoroughly revised, and new addresses are added to make it up-to-date. Those who intend to have a business connection with that country will find the book helpful.

Shuttlecocks.

We have received samples of shuttlecocks manufactured by Messrs Tarun & Co., 3D, Maharani Hemanta Kumari Street, Calcutta. The samples before us appear to be durable. Their make-up and finish are all that can be desired. We wish them a wide market.

An Advertising Weekly.

We have received the first issue of the Madras Weekly Advertiser, an organ for promoting trade and commerce, from its publishers Gowri & Co., 121, Coral Merchant Street, Madras. Its annual subscription is Rs 3 only.

A New Soap Material.

We have received from Kashmir Chemical Industries, 30, Circular Road, Lahore a sample packet of bentonite, which is claimed to impart to the soap the properties of eliminating all dirt, grease, and oil stains from cloth.

An Insurance Journal.

We are glad to receive a copy of the "Insurance News," a new monthly in Urdu. The August issue under notice contains many illustrated articles dealing with insurance problems. It is published from Gokal Street, Krishna Nagar, Lahore.

Yoga.

We have received a copy of Yoga, an illustrated monthly on the Science of Yoga. It contains practical, scientific and academical discussions on the theory and practice of yoga. It is published from Yoga Institute, Post Box 481, Bombay.

Pocket Diaries.

We are glad to receive three specimen copies of Globe Diaries for 1936 from Globe Typewriting Co (India), Bunder Road, Karachi. The paper, ruling, binding, and get-up of the diaries are very neat and clean, and they may be compared favourably with English diaries.

Art Calendar.

We acknowledge with pleasure the receipt of a copy of Indian art calendar for 1936 from Basel Mission Press, Mangalore, S K. It is profusely illustrated with natural scenery to show the people beauty and peculiarity of this country.

Hair Darkening Oil.

We have received from Naba Prakash Ousadhalaya, 121/2, Collin Street, Calcutta a sample phial of Nabaraj Oil. It is said to be prepared with rare medicines, and is claimed to possess the property of turning grey hair black.

Money Bag.

We have received with thanks one leather money bag from Lucky Brothers, 1, Sayana Building, Lohar Chawl, Bombay No. 2. It is durable, attractive in design and charming to look. We recommend our readers to give them a trial.

The Lord Reay Industrial Museum, Poona.

For supporting, popularizing, and organizing the members of the silver-smithy, and gold-smithy trade of Poona and Poona District, an Exhibition of the manufacturers of jewellery, silver-smithy, gold-smithy, engravings, and allied trade is being organized by the Board of Trustees of the Lord Reay Industrial Museum in Poona towards the end of this year.

The Panday Textile Trust.

The above trust was established by Mr. Cowasji Dorabji Panday with the object of the improvement and general advancement of the literate upper and middle staff of the cotton textile mills of India by granting them facilities and opportunities to improve their education, moral and social status, particularly the technical knowledge of the branch they are working for the better discharges of their duties and services. We congratulate the trust for its humanitarian work they have undertaken.

Trade Enquiries.

To communicate with any party write to in direct with name and address given below mentioning Industry).

2753 Indian Industrial and Chemical Works, Jalgaon—Wants to be put in touch with suppliers of pure clay and sangayal.

2757 Bihar Stores, Chapra—Intend to invest Rs. 25,000 in any profitable industry to be started either at Chapra or at any place in Bihar.

2764 Lipton Dohing, Cherrapoonjee—Can supply wild pepper in large quantity.

2783 S. A. Hassan B.A., C/o, Moukie Syed Zafuruddin Ahmed, S. I. Police, Sanbarsa, Muzaferpur—Wants to be put in touch with the dealer in old rags and waste paper.

2839 Angara Veera Raju, Gudivada, Kistna—Wants to be put in touch with suppliers of soft, raw ginger.

2812 Sekhri & Co., Ram Gali, Lahore—Want to be put in touch with the suppliers of cleaned pigs bristles.

2857 Amar Chand Gulabchand & Co., Perumal Kovil Street, Tirupur—Want to be put in touch with the dealers in neem oil, neem oil cake, musambaram, ground nut oil.

2846 T. Bay, Jorhat, Assam—Can supply tiger fat.

2950 B. B. Mazumdar, 5, Chakku Khanasama Lane, Room No. 5, Calcutta—Can supply datura stramonium, belladonna, anantamula, etc.

2953 Dr F. X. Sales de Andrade, Near Church, Nova Goa—Wants to be put in touch with a mining engineer able to work mines or deposits of china clay, lime stone, etc. and with a mechanical engineer or expert to work small kind of machinery.

2980 Mayne & Co Beadon Road, Post Box 82, Lahore—Wants to be put in touch with the suppliers of beeswax, gums, herbs, drugs, dyeing and tanning materials, minerals and waste products in India.

2917 Sayed Magsood Hasan, 73, Colootola Street, Calcutta—Wants to be put in touch with importers of all kinds of Indian raw and manufactured goods including raw hides and skins, wool, hair, and all kinds of dried glue-stick materials, gut, tallow, tea, honey, beeswax, Indian condiment, sun helmets, leather sundles, tanned leather, gas mantles, etc. in all countries of the world viz. Asia, Europe, Africa, America, Great Britain, Ireland, British India, British Dominions, Colonies, etc.

2914 G. K. Mehta, Muzi Shahi, Paris—Can supply cash.

2915 B. C. Mehta, 17, Tarschand Bhatt Street, Calcutta—Wants to be put in touch with persons who can sell for any profitable business

like sugar manufacture, needle making, hosiery industry, pin-making, hack-saw blade, etc.

3072 Dharendra Nath Bhattacharjee, Andal Baria, Nadia—Can supply molasses (Gur) of date palm in very large quantity. Wants to be put in touch with a capitalist who can invest Rs. 10,000 in a profitable business.

JANUARY ISSUE OF INDUSTRY.

(In the Press.)

January issue of Industry which will be published on the first day of the month will contain articles on Wood Dyeing, and Manufacture of Glue and Gelatin besides the usual features such as Small Trades and Recipes; Formulas, Processes and Answers; Readers' Business Problems; Brief Queries and Replies. Any friend of our subscribers will get a copy free as sample on application to the Manager, Industry, Shambazar, Calcutta.

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All charges for advertisement from old and new parties are strictly payable in advance and no request for realisation by V. P. P. is entertained unless substantial deposit is previously made.

Contract especially as regards position is not valid unless confirmed by us in writing and accompanied by cash in sufficient time. Advertisement when published in other places than ordered for is payable at the rate scheduled for that position.

Ordinarily advertisement forms close on 20th of the month and all copies and remittances must reach this office at least two days before the date, and for special issues, 10 days before that unless otherwise notified.

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